Explaining success and failure in development

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Universiteit Maastricht

Adam Szirmai

Explaining Success and Failure in Development

Faculty of Humanities and Sciences

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Explaining Success and Failure in Development

Intreerede
In verkorte vorm uitgesproken bij de aanvaarding van het ambt van hoogleraar Governance, Policy Analysis and Development Economics aan de Faculteit Humanities and Sciences van de Universiteit Maastricht.

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door

Adam Szirmai

Maastricht University

Mijnheer de Rector, waarde collega's, zeer gewaarde toehoorders.

During the last 60 years many myths about development have been exploded through sober empirical analysis and measurement of development trends. Developing countries are not inevitably condemned to poverty and stagnation. Life expectancy at birth has increased by some 25 years. Child mortality has declined and human capital has increased. Contrary to Malthusian predictions, food production has outpaced a rapidly growing global population, especially in densely populated developing countries. Developing countries are not locked into agriculture and mining. They can become powerful global players in manufacturing production and exports. Table 1 summarises a number of these dramatic changes. However, it also serves to highlight how many people are still living in dire poverty..

Table 1: Dynamic Changes in the Developing World, 1950-2005

	1950-60	1981	2000-05
GDP per capita (1990 PPP$), 1950, 2003	854.9		3645.6
Food production per capita (1980 = 100)	88.0		147.0
Manufactured exports as % of commodity exports	6.0		53.0
Life expectancy at birth	40.8		65.4
Child mortality by age 1	180.0		65.0
Child mortality by age 5	281.0		95.0
Gross Enrolment Rate primary education	75.8		103.9
Gross Enrolment Rate secondary education	15.7		58.3
Gross Enrolment Rate tertiary education	2.1		13.0
Net Enrolment Rate primary education	48.1		82.0
Net Enrolment Rate secondary education	35.0		45.0
Percentage of population, with less than 1 dollar a day		40.4	21.1
Number of persons with less than 1 dollar a day		1481.8	1092.7
Percentage of population, with less than 2 dollars a day		66.8	52.9
Number of persons with less than 2 dollars a day		2449.8	2735.5

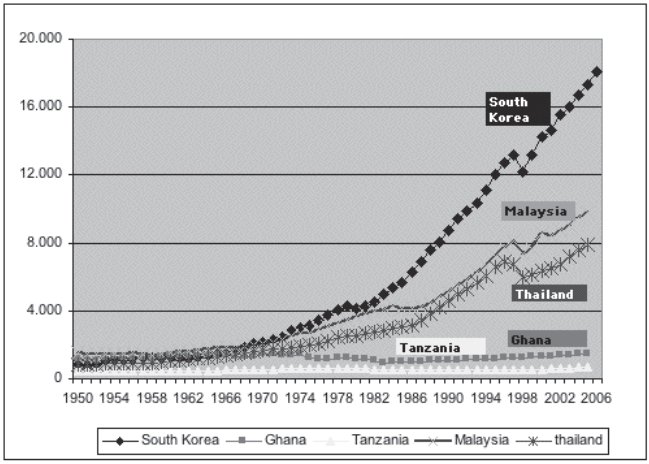
Sources: Szirmai (2007): www.dynamicsofdevelopment.com;

GDP per capita from Maddison, 2007

Diversity of country experiences

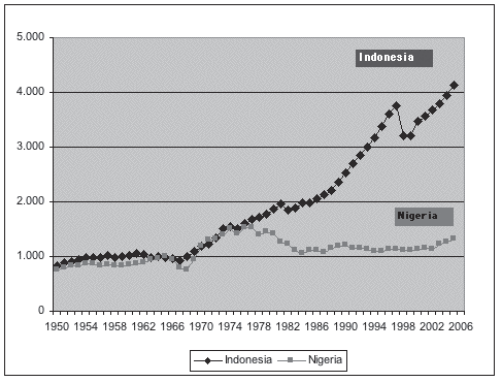
One of the most striking phenomena in the study of development is the diversity of developing country experiences, especially since the oil shock of 1973. In Asia, several countries have experienced rapid growth and catch up, including Taiwan, Korea, Singapore, Hong Kong, China, Malaysia, Thailand, Turkey, Sri Lanka, India, Indonesia and Vietnam. Many Latin American economies grew rapidly until 1980, but their growth momentum has faltered since 1973 and their prospects are uncertain. With the exception of tiny countries such as Mauritius and Botswana and the exceptional case of South Africa, African countries have by and large experienced long-run stagnation since 1973, after a period of growth between 1950 and 1973. In the Middle East, economic performance of most countries has been weak, in spite of vast oil resources. Few of the oil-rich countries have been able to use their mineral resources to generate sustainable growth in other sectors of the economy. As a result of these divergent trends, developing countries that had similar levels of per capita income in the 1950s, such as e.g. Ghana and Thailand, now show vast differences in levels of economic development (Lal and Myint, 1996). These divergent trends are illustrated in the following three figures.

Figure 1:
GDP per capita (1990 PPP$) in Asia and Africa,
(South Korea, Malaysia, Thailand, Ghana, Tanzania), 1950-2006



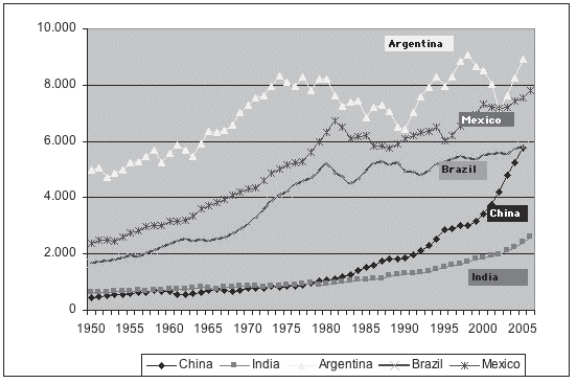
Sources: 1950-1990, Maddison (2007); 1990-2006: GGDC, 2007

Figure 2:
GDP per Capita (1990 PPP$) in Oil Rich Countries Indonesia and Nigeria, 1950-2005



Sources: 1950-1990, Maddison (2007); 1990-2006: GGDC, 2007

Figure 3:
GDP per capita (1990 PPP$) in Asia and Latin America Argentina, Brazil, China, India, Mexico, 1950-2005



Sources: 1950-1990, Maddison (2007); 1990-2006: GGDC, 2007

In this lecture, I will explore what we can learn from these diverse experiences and the wealth of empirical studies about them.[1] Can we

[1] The lecture is an attempt to summarise, synthesize and further develop the insights from my textbook *The Dynamics of Socio-Economic Development*, CUP, 2005. The empirical data underlying the arguments are included in the book. Updates of these data are provided on the website: http://www.dynamicsofdevelopment.com

come up with systematic explanations of relative success and failure in socio-economic development, or does it all remain a mystery or a matter of luck? To what extent can we assess future trends on the basis of past experiences?

The Failure of Monocausal Explanations

Explaining economic development is not for the simpleminded. The first observation that one can make is a negative one: every single monocausal explanation ever advanced for development falls down in the face of the empirical evidence.

Max Weber explained the breakthrough of capitalism in North Western Europe from the *religious characteristics* of the Protestantism. But, Max Weber's *Protestant Ethic* cannot cope with the recent economic success of Confucian countries

Differences in degrees of *corruption* cannot explain why some countries stagnate and others develop. Some countries and regions such as present-day China or Indonesia under Suharto prosper in spite of pervasive corruption, while others suffer deeply. Some types of corruption seem to be economically sustainable.

Climatic and geographic determinists such as Jeffrey Sachs or Jared Diamond cannot account for the phenomenal success of landlocked economies such as Switzerland, Austria, Botswana or rapid growth in tropical regions such as Malaysia, Thailand or Southern China.

Japan, Korea and Taiwan have shown how countries can achieve phenomenal economic development with scarce *natural resources*. Coal, steel and oil are not essential for successful development. Oil and mineral resources have often – but again not always - turned out to be a bane for economic development, as in the case of Nigeria, Congo or Venezuela, but less so in the case of Indonesia, Qatar or Botswana.

Capital accumulation is an ingredient of every conceivable development strategy. But high rates of investment are no guarantee for sustained growth of per capita output or total factor productivity. If the capacity to absorb investment is lacking, mobilising national or international resources for investment results in waste and inefficiency.

Human capital seems to be important in successful development experiences. But many African developing countries have achieved great success in expanding their education systems, without the corollary of economic growth (Pack and Paxson, 2001).

Protection of *property rights* has often been advanced as a key precondition for innovation, technological change and economic

progress (North and Thomas, 1973). But the case of China since 1978 illustrates that explosive growth and catch up can coexist with weak intellectual property rights and weakly defined property rights in general (Qian, 2003). To much emphasis on *institutions*, results in what Rodrik (2006) has called institutional fundamentalism. Either failures of reform can be explained away, because reform has never gone far enough, or the difficulty of achieving institutional reform becomes an excuse for inaction.

Marxist and other theories of *colonial and neo-colonial exploitation* fail to explain why some former colonies break the mould of dependence and stagnation and emerge as dynamic economies, and others do not. Why did the USA become the world productivity leader while Brazil and Argentina have remained developing countries, though their decolonisation was only a few decades apart?

Much has been made of *good economic policies*. It is certainly true that disastrous policies such as those of Zimbabwe's Mugabe or Indonesia's Sukarno can wreck a country. But apart from that policy variables such as openness to foreign investment, macroeconomic policies, price distortions, financial policies, and trade openness do not have predictable and robust effects on growth rates (Rodrik, 2006).

The first insight that follows from this is that it is seldom single factors, which explain breakthroughs and successes in development. Rather, it is the interaction of many complementary internal and external factors and determinants and the timing of these interactions.

Next, it would seem that older development economists such as Hirschman, Gerschenkron, Myrdal and Geertz are right. In his still eminently readable book *Strategy of Economic Development* (1958), Alfred Hirschman argues that one cannot compile a fixed list of 'prerequisites' for economic development, which would automatically result in economic success. There may be functional alternatives for the so-called prerequisites, and the prerequisites may vary in time and space. In a similar vein, the anthropologist Clifford Geertz argued in *Peddlers and Princes* (1963) that almost any religion and culture has elements which under given circumstances can promote growth and in other circumstances can block it. Since Kemal Atatürk, Islam is often referred to as a cultural obstacle to economic development, but Geertz documented the dynamic entrepreneurial attitudes amongst devout Indonesian Muslims as his prime example. Also, in present day Turkey, devout Muslims from Anatolia are a dynamic economic and entrepreneurial force in modern Turkey. In different ways, both Gerschenkron and

Myrdal highlighted the importance of changing initial conditions, as a result of which processes of development are never the same as earlier processes.

Rather than a fixed list of prerequisites or causal determinants, it sometimes appears that it is simply success that generates further success. Once dynamic processes of economic and technological change have been set in motion, these mobilise and call forth new talents and resources, which contribute to further development. Once growth is underway, economic success becomes path dependent and it seems as if new opportunities create further opportunities and policy makers can hardly do anything wrong, as in current China. The sources of growth in successful development experiences may differ, but whatever the sources, success feeds upon itself in what Myrdal (1968) referred to as cumulative causation.

On the other hand, once development stagnates, as a result of external shocks, misguided policies, political instability or bad luck, it may be very difficult to get things moving again, as evidenced by Indonesia after the Asian crisis of 1997 and Sub-Saharan Africa after the 1973 oil shock. Failure feeds on failure, just as much as success feeds on success.

This notion of path dependence is further elaborated in modern evolutionary economics, which suggests that small initial differences are reinforced over time. Small initial changes set in motion cumulative process of growth and decline which cannot be predicted in advance, especially as the initial conditions for development are different in every region and historical period.

The rather unsatisfactory corollary of this is that successful development might just be a matter of luck and that we cannot learn all that much from successful development experiences in the past. It is my conviction, however, that we should be able to do better than that on the basis of the empirical record. Though historical experiences are never repeated in unchanged form, though initial conditions differ and though development patterns are seldom identical, we can learn from a systematic empirical analysis of past experiences of growth and stagnation.

Long-Run Divergence and Increasing Fluidity in the International Order

The technology race in long-run perspective: divergence of levels of per capita income.

Development needs to be studied in the context of a changing international economic and political order. One can conceive of the international economic order as an arena for a technology race, where countries and regions compete with each other over decades and centuries in terms of technology, productivity, GDP per capita and standards of living. In the long run these phenomena are closely linked. Technological advance fuels productivity growth. Growth of productive capacity translates into growth of per capita incomes and improving standards of living, health and education.[2]

In the World Economy: A Millennial Perspective (2001) and other publications, Angus Maddison has charted and quantified the long-run development of the world economic order. In Europe the acceleration of growth dates back to the fourteenth century, when Europe overtook the incumbent technological leader China.[3] From the fourteenth century onward, Europe experienced a long-run increase in per capita incomes, which also spread to the Western Offshoots. Since 1820, per capita incomes in the Western world have increased 20-fold (Maddison, 2007, p. 70). As other regions and countries did not participate to the same extent in this growth process, global divergence increased.

Among the unique characteristics of this long-run growth process are the dual nature of sustained internal growth and five hundred years of external economic and political expansion of the Western world. This resulted in the creation of a single interdependent world economic order, but not a global empire. The length of the Western growth experience contrasts with earlier cyclical economic movements of growth and decline.

International interdependence reached a peak in the period 1870-13 (whether measured by foreign investment, people flows, or trade flows). Global interdependencies were temporarily reduced in the

[2] In this lecture, I do not touch upon the increasingly pressing issues of global environmental sustainability. Given the immense problems of poverty, malnutrition and non-fulfilment of basic needs, setting the dynamics of growth and economic development in motion remains the most urgent priority for poor developing countries. The advanced economies, which are responsible for the lions' share of global pollution and global warming, should take the lead in making global growth more sustainable.

[3] Maddison dates the overtaking of China by Europe a century earlier than previous observers have done.

autarkic period between the two world wars of the twentieth century Globalisation picked up again after 1950, though it was only in the 1970s that globalisation reached levels similar to those of 1913.

Post-war globalisation differs in at least two interesting respects from the earlier globalisation process. The first wave of globalisation coincided with the imperial expansion of the Western countries. The second wave of globalisation took place in the context of political decolonisation and western contraction, which started in the Middle East in the 1930s and was completed in 1989 when majority rule was achieved in South Africa. Next, the earlier global division of labour primarily expressed itself in flows of products, with developing countries exporting primary products to the advanced and advanced economies exporting manufactured goods to the developing world. The present globalisation trend involves deeper forms of functional integration. The international division of labour now revolves around the relocation of stages of the global value chain rather than final products (Dicken, 2003) and a key role for multinational companies in managing global trade.

Fluidity: long-run shifts in leadership

The growth of the world economy and the evolution of the international order were accompanied by shifts in technological and economic leadership. Technological leadership shifted from China to Southern Europe in 14th century. Within Europe leadership shifted from Italian city states to the Iberian Peninsula, then in the 17th to North Western Europe, more specifically to the Dutch Republic. In the 18th century the, UK became the leader with breakthroughs in industrial production technologies. Around 1890, leadership shifted to the USA, which pioneered standardised production for mass markets and which has retained its lead in the post-1950 period.

The productivity acceleration in the USA in the 1990s indicates that the USA shows no signs of losing its leadership in the short term. However, the Iraq war has shown the limits of US military dominance and persistent current account deficits and a declining confidence in the dollar may be the first signs of faltering leadership. Also, the twenty-first century is witnessing the emergence of the Asian Giants China and India, whose weight in the world economic order is rapidly increasing.

The long-run shifts in leadership imply that in historical perspective there are no insurmountable gaps between leaders and followers and that world hierarchies are far from immutable.

Fluidity: Catch up and relative stagnation

Since the last quarter of the nineteenth century accelerated catch up processes took place in Germany, Russia (Gerschenkron, 1962) and Japan from 1868 onwards. Western European countries were catching up relative to the USA between 1950 and 1973. Japan's catch up streak continued till 1990, followed by a long spell of sluggish growth and relative stagnation. Latin America grew rapidly from 1900 till 1980 (Hoffman, 1998; Maddison, 2001), catching up in some subperiods, though not all. After 1982, the shock of the debt crisis threw growth off-track in Latin America and triggered the lost decade of the 1980s and the subsequent economic instability.

In Asia, South Korea, Taiwan, Singapore and Hong Kong provided spectacular examples of catch up from 1950 onwards. Since the 1980s, second-tier NICs such as Malaysia, Indonesia, Sri Lanka and Thailand have joined the race, while growth of output and productivity accelerated in the 1990s in China, India and Vietnam.

As previously noted, since 1990, the catch-up process of Japan slowed down as Japan drew closer to the world frontier and had to make a painful shift from imitation to innovation.[4] Productivity growth in the European economies and Japan lagged behind the accelerating productivity growth of the USA. Latin America experienced relative stagnation since 1980, both relative to the world leaders and relative to emerging Asia. The countries of the former Soviet Union have experienced large contractions of their economies after 1989. Recovery has since set in in some of these countries including the Russian Federation, but not all of them. One of the most dramatic examples of long-run comparative decline was Argentina where the sustained populist policies of Peron destroyed the economic promise of the forties. The resurgence of populist policies in Latin Africa bodes ill for the economic future of the continent.

Sub-Saharan Africa has been experiencing stagnation since the oil crisis of 1973, but growth rates in several African countries have increased after 2000, fuelled by increasing demand for primary products. Some African countries such as Mozambique, Tanzania, Uganda and Angola are now experiencing rapid growth.

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4 Fagerberg and Godinho (2006) argue that catch up involves more than merely imitating. It can also involve developing radical new ways of organization production and distribution.

The paradox of increasing global inequality and accelerated catch up

The technology race has resulted in a dramatic increase in long-run inequality in per capita incomes between countries. Around 1820, Maddison estimates that rich countries such as the UK had a per capita income of twice that of India. In 2006, the richest 29 countries are 14.2 times as rich as the 48 poorest countries (at purchasing power parities) (WDI Database, 2008). In 2006, the ratio of the richest country in PPP terms, the USA to the poorest country, Burundi, was over 60 to 1.[5]

The increase in global inequality demonstrates that is possible for some countries to experience sustained growth, escaping the shared poverty, characteristic of pre-modern agricultural economies. The concept of development itself is inextricably entwined with the long-run increase in global inequality between countries. If some Western countries had not forged ahead since the fourteenth century, the very notion of development as a long-run improvement in economic and social conditions would have been inconceivable. Catch up experiences show that development is also possible for countries that start at the bottom rungs of the global income and productivity ladder.

Paradoxically, as the steps on the global income ladder move further apart, the speed with which countries change their positions in the income ranking is also rapidly accelerating. Changes in the position of countries in the international technology race are not new. But, the high growth rates of China and earlier Japan, Taiwan and Korea in the twentieth century have not yet been witnessed in economic history. In one or two generations, such countries move from the very lowest positions to the middle or even the upper ranges of the income ladder.

Thus, the experiences since 1950 indicate that increasing global inequality does not result in an insurmountable divide between rich and poor countries. Rather, the global income distribution becomes increasingly fluid.[6] The boundaries between richer and poorer countries are continuously shifting. Formerly rich countries such as Argentine or the Russian Federation show relative decline. Formerly poor countries such as Ireland, Spain, Portugal, Taiwan and Korea move upwards. It is

5 The exact ratio depends on how one defines the set of poorest and richest countries. It also depends on whether or not one has a balanced panel with the same countries defined as poor and rich at the beginning and the end of the period. Nevertheless, the long-run trends of increasing inequality are unmistakable.

6 An interesting characteristic of the international order after 1973 is that growth trends in the developing world have become divergent, with catch up in some regions and relative and absolute stagnation in others. This is a clear contrast with the period 1950-73.

worth emphasizing that many of the catch-up countries are countries with large populations (India, China, Indonesia or Vietnam).[7]

The Asian miracle is not a miracle

Most of the catch up since 1950 took place in Asia. The literature abounds with references to the Asian Miracle or the Chinese Miracle. This is a misnomer. Very high growth rates are the normal pattern in a catch up process, where technological backward countries can profit from international available technological knowledge without bearing the costs and risks of developing new knowledge. If catch up takes place, it is usually happens very rapidly. If not, then a country will continue to fall behind. Table 2 provides evidence of the high rates of growth which are characteristic of catch up economies in the period since 1950.

7 This aspect of the international order is missed in the twin peak studies of Danny Quah (1997), which assign equal weight to all countries irrespective of their size and suggest insurmountable gaps between rich and poor countries.

Table 2: Post-War Catch Up Episodes

Country	Period	Growth of GDP	Growth of GDP/capita
China	1978-2006	8,1	6,9
West Germany	1950-1973	6,0	5,0
India	1994-2006	6,7	5,1
Indonesia	1967-1997	6,8	4,8
Ireland	1995-2006	6,2	6,2
Japan	1946-1973	9,3	8,0
Korea	1952-1997	8,2	6,3
Malaysia	1968-1997	7,5	5,1
Russia	1998-2005	7,2	7,2
Singapore	1960-1973	10,0	7,6
Taiwan	1962-1973	11,4	8,7
Thailand	1973-1996	7,6	5,8
Vietnam	1992-2005	7,6	6,1
World	1950-1973	4,9	2,9
World	1973-1997	3,1	1,4
World	1997-2003	3,5	2,3

Sources: Country data 1990 and before, plus figures for world total from Angus Maddison, Historical Statistics, World Population, GDP and Per Capita GDP, 1-2003 AD (Last update: August 2007) http://www.ggdc.net/maddison/

Country data 1991-2006 and West Germany from:

The Conference Board and Groningen Growth and Development Centre, Total Economy Database, November 2007, http://www.conference-board.org/economics" .West Germany from Conference Board/GGDC

Note: The periods have been chosen so as to maximise sustained high growth rates over an extended period

Proximate, Intermediate and Ultimate Sources of Growth

The framework

For the analysis of success and failure in long-run economic development, the framework of proximate and ultimate sources of growth developed by among others Angus Maddison (1988) is very useful.[8]

The *proximate sources of growth* suggest ways in which countries can try to improve their position in the international technology and productivity race. The proximate sources refer to the directly measurable sources of growth of output such as capital accumulation, embodied technological change, growth of labour input and human

[8] Recently, a somewhat similar framework has also been put forward by Rodrik (2003), though without reference to the earlier work in this field.

capital, exploitation of natural resources and the increasing efficiency with which resources are used to produce a flow of goods and services. In terms of growth of output per capita, the growth equation can be expressed in terms of capital intensity, human capital intensity, resource intensity and total factor productivity.

It is long known (Abramovitz, 1989; Nelson, 1996; Rodrik, 2003) that one should be very careful in giving the sources of growth equation a strong structural interpretation. As Rodrik notes for instance, capital accumulation and efficiency of the use of resources are themselves endogenous. "…. observing that 80 per cent of growth is "accounted" for by accumulation does not tell us that growth would have necessarily been 80 per cent as high in the absence of technological change; perhaps in the absence of productivity change, the incentive to accumulate would have been much lower and the resulting capital deepening significantly less….. the causality may well run backwards, from growth to accumulation and productivity…."(Rodrik, 2003, p. 4). So we should think of accumulation and productivity as proximate determinants of growth at best. Nevertheless, the sources of growth equation sets the stage for what we want to explain and analyse.

Proximate sources of growth include the following

• *Saving and Capital accumulation*. Being sober and abstaining from current consumption in order to save and invest results in capital accumulation. Output per person engaged is increased by supplying workers with implements, machines and capital goods. The amount of capital per worker - capital intensity - increases. Not only does the amount of capital increase, but also its quality. Capital accumulation goes hand in had with capital embodied technological change. Capital accumulation can be more easily realised in spatially concentrated manufacturing than in spatially dispersed agriculture. This is one of the reasons why the emergence of manufacturing has been so important in growth and development.

• *Increased scale of production*. Large-scale production of standardised products is usually more productive than small-scale production. As in the case of capital accumulation, scale economies are more easily realised in manufacturing than in agriculture. Recently, in the context of more flexible production systems, economies of scope have received more emphasis. But, economies of scope also assume production on a very large scale for very large markets.

• *Increased effort*. Output per person is increased by increasing the

labour input per person. This can take a variety of forms, including higher labour market participation and longer hours worked. Also of importance is the discipline and intensity of effort of members of the work force. This is why is how investments in health can affect the quality and intensity of labour input. Health status influences the physical and mental energy available for various kinds of work. Intensity of effort also links up with culturally defined attitudes, incentives and motivations with regard to work.

• *Accumulation of human capital*. Human capital theory suggests that schooling and education makes workers more productive. Accumulation of human capital may take place through formal schooling, but also through on-the-job training, learning by doing and by using new technologies. If the education system is adequate it transfers the latest state of knowledge to its students. This means that accumulation of human capital represents labour embodied technological change.

• *Exploration and exploitation of natural resources*. This involves investment in land preparation for agricultural use and investment in the exploration and exploitation of energy resources and mineral raw materials. Exploitation of mineral resources can promote growth, but such growth will not be economically sustainable unless the revenues from windfall discoveries are transformed into more durable sources of growth in other sectors of the economy.

• *Theft*. Appropriating resources from other societies and using these to accumulate capital. Theft and colonial plunder can be an important source of capital accumulation. However, if resources are appropriated but not reinvested, they will have the same non-sustainable effects as windfall discoveries of natural resources. In the dominated society, the effect of appropriation is to reduce the investable surplus, thus contributing to economic stagnation.

• *Increased efficiency*. Efficiency subsumes a wide range of economic aspects such as economies of scale, capacity utilisation, effective use of existing technologies (technical efficiency), appropriate combinations of labour, capital and intermediate inputs (economic efficiency) and international specialisation according to comparative advantage. Structural change is also an important aspect of increased efficiency. Structural change involves shifting resources from sectors with lower productivity, lack of dynamism and weak linkages (such as traditional agriculture) to sectors with higher productivity, greater dynamism and stronger linkages (such as manufacturing). Specialisation and structural change result in a better allocation of resources across the economy.

• *Changes in the organisation of production*. This aspect of efficiency improvement (X-efficiency) deserves separate attention. It involves aspects such as the division of labour, flexible production systems, systems of motivation, monitoring systems and changes in the logistic organisation of production.
• *Technological change proper (disembodied technological change)*. Disembodied technological change refers to advances in our technological knowledge concerning products and production processes. It involves the development of new production processes, new types of machinery, new forms of organisation, use of new inputs, new products and services, new ways of distributing products and services, and new knowledge that can be transferred through education.

We can identify the following – partly overlapping - aspects of disembodied technological change: a. changes in a stock of knowledge available to the firm, the sector or the country; b. improvements in the knowledge absorbed by employees and managers in school and on the job through learning by doing. (Maddison, 1987, p. 662); c. improvements in technological capabilities of firms and social capabilities of countries d. the positive external effects of knowledge spillovers within an economy or between economies.

With regard to technological change we need to distinguish between technological change at the frontiers of knowledge in the lead economies and diffusion and absorption of technology in the follower countries.
• *Complementarities of human skills and human capital and increases and improvements in the capital stock*. Abramovitz has emphasized the importance of complementarities between the proximate sources of growth. Among the most important of these complementarities is that between capital goods embodying new technologies and improvements in skills and human capital. Without appropriate inflows of new capital, new skills will be wasted (Pack and Paxson, 2001) and vice versa. Thus, the joint effect of accumulation of human capital, and physical capital may be much larger than the sum of the separate contributions.

What complicates the issue, however, is that complementarity does not necessarily mean simultaneity. There are indications that prior investments in human capital set the stage for subsequent effective deployment of physical capital (Godo and Hayami, 2002; Sandberg, 1982). The time lags involved can be substantial, up to 40-60 years.

Intermediate sources of growth refer to trends in domestic and international demand and economic policies, social policies and

technology policies. The intermediate sources of growth are important for the understanding of path-dependent nature of processes of success and failure. Thus when world demand and domestic demand is growing and market shares are expanding, this will help mobilise the accumulation of human and physical capital, which results in further growth and competitiveness.

Interpreting socio-economic policy as an intermediate factor emphasizes that policy is in turn influenced and constrained by more ultimate factors such as interests and class relationships. This is increasingly being rediscovered in recent research in political economy (e.g. Acemoglu et al. 2001; Acemoglu and Robinson, 2005, Shleifer, 1993, Shleifer et al. 2004), which see policy itself as an endogenous variable, explained by more ultimate factors as the balance of power and interests within societies.

Note that even within the proximate sources, there is circularity, as total factor productivity growth and technological change provide incentives for human and physical capital accumulation.

The ultimate sources of growth refer to historical trends and the geographic, social and political conditions within which the proximate and intermediate factors operate. The ultimate sources include: a). geographic location, climate and natural resources; b). demographic and epidemiological trends; c). the history of political centralisation and state formation; d). the dynamics of class relationships, political conflict; e). the evolution of values and attitudes which affect economic behaviour; f). the development of institutions such as private property, intellectual property rights, joint stock companies, banking institutions, institutions for conflict management and maintenance of law and order, institutions which align economic incentives with social costs and benefits; g). developments in the international order, such as the international trade regime; h). long-run developments in science and technology; i). the distance of a country to the technological frontier, which determines its catch up potential; j). absorptive capacity and the evolution of technological and social capabilities.

In a recent version of the framework of proximate and ultimate sources of growth, Dani Rodrik (2003) emphasizes three key factors: geography (resources and location), institutions and openness to trade. Of these three, he argues that geography is the most ultimate. It influences the proximate resource endowment of a country, as well as its opportunities for trade through its location. Openness to trade and

institutions are seen as more intermediate sources, with institutions and institutional quality providing the key to the explanation for development.

The use of the term ultimate sources of growth is not meant to imply a linear model of causality. Causality is circular, with economic growth obviously affecting demographic and epidemiological transitions in well-known ways. In the long run even cultural values and institutions are shaped and reshaped in the course of economic development (Harrison, 1985; Harrison and Huntington, 2000)[9]. The difference between the more ultimate and more proximate sources of causality lies mainly in the ease of quantification and the longer the time span of the chains of causality. It also provides a research strategy, which starts with the measurable economic factors and then goes beyond that to broader social and historical determinants. It also provides a framework for multidisciplinary analysis of economic development.

Initiating Growth and Maintaining Growth

In the context of a discussion of policy reform, Rodrik (2006) has made an important distinction between initiating growth and maintaining growth. The factors that initiate growth may not be the same as those important for maintaining growth. In order to initiate growth, one needs to identify the binding constraints facing a specific country. These will differ from country to country, so that policies which are successful in one setting may completely backfire in another. There are no standard recipes for kick-starting growth. This explains why so many of the cross-country regressions with policy or institutional variables give inconclusive results.

Once growth is underway, the question is how to maintain it in the longer run. Here gradual institutional improvements, which may not have been a binding constraint for starting growth, become more important. One might say that growth buys time for deeper institutional reforms. In absence of such reforms, an economy for instance remains vulnerable to external shocks, which may put a country off an accelerating growth path and put it on a stagnating trajectory. Examples of such external shocks are major wars such as World War I and II, financial crises such as the Asian crisis of 1997 or the debt crisis of 1982.

External shocks can also have positive economic effects, such as the cataclysmic communist revolution in China or land reform in post-

9 Ester Boserup has argued that even the seemingly ultimate factor of 'natural' environment has been shaped by the impact of human interventions in socio-economic development.

conflict Korea and Taiwan. It can have deep negative effects such as the impact of the debt crisis of 1982 on Latin American development, or of the Asian crisis on Indonesian economic development. Sometimes the same shock has very different effects on different countries. Most Asian economies recovered quickly from the Asian crisis, but Indonesia needed 10 years to regain to its pre-crisis levels of GDP per capita. Shocks interact with the strength and effectiveness of domestic institutional arrangements. Strong shocks combined with weak institutions and policies may have disastrous effects and put an economy on a downward growth trajectory.

Of course, there can be no long-run success without success in initiating growth in the short run. But the explanations of long-term growth and development are different from those of success in initiating growth. In this lecture, I focus on the long-run patterns of growth and development.

Theories of growth

Classical theorists such as Adam Smith and John Stuart Mill focus on ultimate factors such as the emergence and functions of market institutions. Karl Marx emphasized the dynamics of market competition, technological change and class relationships in the capitalist system. Max Weber focused on importance of political centralisation and stability and the religious underpinnings of the work and savings ethic. Schumpeter wrote eloquently about the emergence of entrepreneurship as the source of creative destruction and economic growth and on different types of market competition and their impact on innovation. In his later work he worried about the social forces such as bureaucratisation of research which were undermining entrepreneurship. Dependency theorists explain the underdevelopment of developing countries through the institutional characteristics of an exploitative international economic order.

Post-war neo-classical growth theories focus much more on proximate factors such as education, capital accumulation or comparative advantage. Until recently, mainstream economic theories have tended to disregard ultimate factors such as the evolution of markets, institutions, class relations and technological change. These were dismissed as exogenous and are relegated to despised disciplines such as history, sociology or anthropology. Only recently have mainstream economists rediscovered institutions (e.g. Easterly, 2001; Rodrik, 2003; Acemoglu, 2005).

Theories of growth are radically different in their predictions about the chances of catch up in developing countries. Neo-classical theories of growth predict convergence between rich and poor countries, as the returns to capital are higher in poor countries where capital is scarce. This prediction runs counter to the empirical evidence which suggests long-run divergence. Theories of conditional convergence present a modified version of the neo-classical argument, which suggests that within groups of countries with similar initial conditions levels of GDP per capita tend to converge. However, the steady-state growth rates of the different growth clubs may differ so that divergence between convergence clubs may or may not result in global divergence. The problem with this strand of theory is that it does not explain why different clubs of countries converge of diverge. Endogenous growth theory, a modern version of neo-classical theory predicts systematic divergence between leaders and followers, because firms in the lead economies benefit from technology spillovers resulting in constant or even increasing returns to investments in capital, education and technology. Thus rich countries will forge ahead and poor countries with less domestic spillovers will fall behind. A weakness of new growth theory is that it cannot easily cope with the evidence on catch up in selected developing countries.

Theories of the advantages of backwardness. Authors such as Veblen, Gerschenkron, Abramovitz and Maddison have argued forcefully that there are great potential advantages to technological backwardness. Technologically backward countries can profit from international technology transfers or spillovers, without bearing the costs and risks of investment in innovation at the knowledge frontier. If their absorptive capacities are sufficiently developed, they can experience explosive growth spurts through rapid incorporation and adaptation of modern international technology.

Growth is explosive for a variety of reasons. First, there are sudden jumps in technological levels. There is an element of leapfrogging from vastly outdated technologies to state-of-the-art technologies, such as digital switching or mobile phone systems. Second, the capital-intensive nature of modern technology tends to make growth a scale intensive process, with an all-or-nothing character (Gerschenkron, 1982). If growth takes place in a technologically backward economy, it will tend to be more rapid than in previous historical growth episodes.

This theory is very relevant for our understanding of the post-war catch experiences in Asia. Also, Gerschenkron has alerted us to the

fact that the conditions and policies underlying growth spurts change over time, given the nature of technology and developments in the international order. This opens up growth theory to historical inquiry.

What remains problematic is how to explain why in a given setting the lead countries sometimes forge ahead leaving followers behind, such as the USA versus Europe and Japan in the nineties, while in other settings the lead countries are overtaken by the newcomers. We encountered a similar problem when discussing conditional convergence. A second question is why some countries profit from the advantages of backwardness in a given period, while other countries fail to do so and fall behind even further. But here, catch up theory does give some promising answers by pointing to the importance of the absorptive capacities of follower countries.

Evolutionary theories of growth (in the tradition of Schumpeter and later Nelson and Winter, 1982; see also Dosi et al., 1988; Freeman and Soete, 1997, Verspagen, 1993; Verspagen, 2001; Fagerberg and Verspagen, 2002). Evolutionary theory combines ideas about advantages of backwardness and technology gaps with notions similar to those of new growth theorists about spillovers in the lead economies.[10] Evolutionary theory postulates a race between technological change and domestic spillovers in the lead countries resulting in divergence and international diffusion of technology to follower countries resulting in catch up. The balance between these two forces is not deterministically given. It depends on the size of the technology gap – when the gap is larger than some threshold level, the disadvantages of backwardness outweigh the potential advantages. It also depends on differences in absorptive capacities between developing countries (Verspagen, 1991). Finally, like theories of backwardness, evolutionary theory allows for changes in historical circumstances and the emergence of new technological 'paradigms' (Freeman and Perez, 1988), which may reshuffle the technological playing field and create new opportunities for backward countries and new penalties of leadership for the lead countries. Thus acceleration of technical change in information technologies created new and previously unconceivable opportunities for catch up through

[10] Evolutionary theory rejects some of the key notions of new neoclassical growth theory such as equilibrium, common production functions and the representative actor. Rather it focuses on varieties of actors following different rules of thumb. The impact of a selection environment on success and failure of economic actors creates path dependent trajectories. Nevertheless, in there are similarities in the endogenisation of technological change (see Verspagen, 2001).

growth in ICT services in countries such as India. It also created new opportunities for manufacturing outsourcing to developing countries, through global value chains, which have had profound impacts on the global division of labour.

Importance of technological change in modern growth theories

Investment in technological change is central to present-day theories of growth and catch up of all stripes, whether new growth theory, theories of backwardness or evolutionary theories. In the deepest sense, growth and catch up has to do with the generation and diffusion of new knowledge and technology. Technological change is entwined with all other factors in the growth equation (capital, education, efficiency, disembodied technological change, structural change), but also plays an independent role as disembodied knowledge or technology. In his wide-ranging analysis of the sources of economic growth, Abramovitz (1989) concluded that underlying the separate sources identified in growth analysis, is a common process of technological change, which manifests itself in a variety of ways.

Knowledge is produced through human effort, and requires investment. But investment in new technology or new knowledge is fundamentally different from investment in physical capital. It is harder to exploit commercially than physical capital goods. The characteristic of knowledge is that it flows, diffuses and spills from firm to firm, individual to individual, country to country. Unless means can be devised to control the unrestricted flow of knowledge and appropriate part of the revenues accruing to new knowledge, there will be insufficient incentives for sustained and costly investment in new knowledge.[11] Thus, restricting or controlling the free flow of technological knowledge is one of the profound sources of growth and development, as it provides an incentive for the production of new knowledge and technology.

On the other hand the rapid diffusion of knowledge is just as important as a source of growth. Investment in knowledge has widespread positive external effects. Firms profit from the advances of knowledge produced by their competitors, and thus growth in knowledge producing countries will accelerate due to these spillovers. The better the absorptive capacities

[11] The importance of patents as a means of appropriation is contested (Nuvolari, 2004). There are those who argue that other methods of appropriation such as secrecy or first mover advantages are more important. Even more important is the notion of open source innovation where sharing common knowledge is the main incentive. It is an interesting debate, but I think the importance of these idealistic alternatives is overrated.

of firms, the less restrictions there are to the spread of technology and the more efficient the national system of innovation (Lundvall, 1992), the more rapid growth will be. The countries that profit most from these spillovers will be the leaders in the technology race.

Diffusion of knowledge and knowledge spillovers are not only important within national economies, they also take place in an international context. It is the international diffusion of knowledge which has contributed to spectacular catch up in a limited number of developing countries since 1950, as emphasized by theories of backwardness. The more the free flow of knowledge is restricted through policy measures or institutional obstacles, the less opportunities there are for catch up based on the advantages of backwardness. Developing countries that acquire, steal, copy and absorb knowledge effectively will be the candidates for catch up.

Thus, diffusion of technological knowledge works in two opposite directions. On the one hand it is the main force making for global divergence in modern theories of growth. The lead countries tend to have the strongest systems of innovation. They will profit most from the advances in knowledge generated by their firms, R&D labs and inventors. On the other hand, international diffusion of knowledge explains very rapid catch up. In the international context of technological leaders and followers, the Gerschenkron/Abramovitz catch up effect can also be seen as a manifestation of international knowledge flows. The greater the gap between leaders and followers, the greater the potential for growth due to knowledge flows. This notion has become generally accepted in growth accounting and growth analysis, but it is not always explicitly linked to the newer concept of spillovers. In any event, a technology gap term is now standard in growth equations. It clearly refers to an important aspect of disembodied technological change.

Though knowledge seems to flow easily, it is nevertheless very difficult to absorb. Some firms are able to absorb knowledge, others fail to do so. At a macro-level differences in absorptive capacities are important in explaining which developing countries embark on a catch up path and which countries fall behind. This is reflected a number of different literatures, which are not always cognisant of each other. These include the literatures on technological capabilities which focuses on absorptive capacities of firms in developing countries, the macro-literature on social capabilities based on Abramovitz which focuses on the absorptive capacities of countries and the literature on systems of innovation pioneered by Lundvall (1992), which can be used to explain

flows of knowledge both within countries and between countries.

Patterns and Explanations

Let us now examine whether we can find common elements and patterns in successful episodes of economic development.

Proximate sources

• *Capital accumulation*

Without exception successful development involves bridging the capital intensity gap and increasing domestic savings and/or foreign inflows of capital. Without rapid accumulation of capital, there can be no success in economic development. Capital accumulation and capital intensification are closely linked with industrialisation.

Developing countries have been remarkably effective in increasing their investment rates since 1950. Saving rates in developing countries are now comparable to or higher than those in the advanced economies. China, in particular, has extremely high savings rates. But, neither the rate of capital accumulation nor the level of capital per worker is a guarantee for a high rate of economic growth. If the efficiency of investment is low and absorptive capacity (skills, education, capability, experience, incentives) is lacking, capital productivity and total factor productivity will be low and the impact of accumulation on growth will be limited. Thus, the very substantial increases in investment rates in sub-Saharan Africa in the post-war period are not mirrored by comparable increases in the rates of economic growth.

• *Net inflow of resources and accumulation*

In contrast to the pre-war period in which many colonies experienced a net outflow of resources, the post-war period is characterised by a net inflow of financial resources to developing countries (Maddison, 1986; Szirmai, 2005). This inflow consists of loans, foreign direct investment, private transfers, aid flows and debt relief. The inflows were briefly interrupted in the late 1980s in the aftermath of the debt crisis of 1982 and in the late 1990s after the Asian crisis. But, after a few years the pattern of inflows reasserted itself. Developing countries have typically imported more than they exported. They have imported both capital goods and consumer goods. On balance, the inflows of capital have contributed to higher savings rates and higher rates of capital accumulation.

• *Human capital accumulation*

In all cases of successful development, investment in human capital, expansion of educational enrolment and increased literacy have been important, in one way or another. The argument of Gerschenkron (1962) that education can be replaced by technologies which economise on skilled labour is not supported by the historical record of catch up countries.

The expansion of education and human capital has been one of the greatest success stories of the post-war period (see Szirmai, 2005, tables 7.1-7.6). In many cases starting from scratch, developing countries have built comprehensive education systems which cover large segments of their populations. Though there are major problems with educational quality and the mismatch between education and the labour market and though universal primary education has not yet been realised in all countries, progress in human capital accumulation is unmistakable. Rates of illiteracy are decreasing and human capital per worker is increasing.

The effects of education on economic development are, however, very complex. Some theorists have emphasized that expansion of education and literacy precedes acceleration of economic development by many decades. This was the case in the Scandinavian countries, Japan, China, Taiwan and Korea (Sandberg, 1982; Nuñez, 1990; Godo and Hayami, 2002). So, expansion of education may not have immediate and direct consequences for growth, as is confirmed by the experiences of many developing countries. In an excellent analysis of the Japanese catch-up experience, Godo and Hayami (2002) combine the notions of complementarity and threshold. The early increase in education initially had little impact on growth, because capital per worker was growing slowly, so there was little complementarity. After World War II, a threshold level of education had been reached and capital accumulation and slower education advance combined to promote explosive growth.

Where educational investment was insufficient, this has generally acted as a brake on development. Thus, expansion and improvement of education in one form or another may be considered one of the important necessary conditions for development.

The concept of human capital is broader than the level of education. It includes health and sufficient nutrition, which also contribute to productivity of households and growth of economies.

• *Structural change: Industrialisation as an engine of growth*
Since 1950, all developing countries that have experienced rapid growth and catch up, have been successful industrialisers and industrial exporters (e.g. van Ark and Timmer, 2003). Countries that fell behind in aggregate terms were also the weakest industrial performers. In the past fifty years, manufacturing has been the main engine of growth and development in developing countries. In other words, the structural change involved in the shift from agriculture to industry has been a key ingredient of successful economic development.

The pattern of structural change in post-war developing countries differed from the earlier pattern in the advanced economies, where the share of industry increased first and the share of services increased later. In developing countries, there was a simultaneous shift from agriculture to industry and services. At an early stage, the share of services was already as high as or higher than that of industry. This has to do with the rapid expansion of the government share in GDP. It is likely that this early growth of a not very productive service sector acted as a brake on development.

Though the share of manufacturing in GDP and employment has increased in a great majority of developing countries, the increasing share of developing countries in world exports of manufacturing goods attributable to some 12-15 countries (including China, India, Brazil, Mexico, Turkey, Malaysia, Indonesia, Thailand, Sri Lanka, Vietnam, Singapore and Hong Kong).

• *The learning curve for industrialisation*
According to Arthur Lewis learning to industrialise is a lengthy process which can take up to 30- 40 years (Lewis, 1978). Both the evolution of industrial entrepreneurship and the submission to the discipline of factory production for a work force being transferred from agriculture are difficult processes which take considerable time. It is worth noting that all the developing countries which were successful in industrialising after 1950, had learning experiences in industrialisation which date back to the 1930s and sometimes even to the nineteenth century, as in the case of China and India. The failed industrialisation of sub-Saharan Africa since 1950 is not due to some innate incapacity for industrial production. It is in part due to the fact that industrialisation really started from almost nothing in the post-war period. This means that future prospects for industrialisation in African countries may be brighter than before.

• *Agricultural development: Decreasing shares, increasing output and productivity*

In contrast to the predictions of Malthusian pessimists, developing countries have been remarkably successful in increasing the per capita output of foodstuffs in the post-war period. The increases have been most striking in large and densely populated developing countries such as India, Indonesia and China (Szirmai, 2005, table 10.1). The exception to this trend is sub-Saharan Africa where output per capita is at the same level as that in 1979-81 and lower than in 1934.

These output and productivity increases have been realised through expansion of arable land, increases in cropping intensities, increases in irrigation, increases in the application of fertilizers and development and diffusion of new seeds (biotechnological change). Increases in yields per harvest (irrigation, fertilizers and technological change) account for over 70 per cent of output growth in the past 40 years (Szirmai, 2005, table 10.8).

These increases in agricultural output have been realised with shrinking shares of agricultural in total employment and shrinking shares of agriculture in GDP. Nevertheless, there is a correlation between successful development in agriculture and overall economic performance in developing countries.

• *Total factor productivity growth and technological change*

In the context of East Asian industrialisation, there is a well-known debate between accumulationists emphasizing the role of capital accumulation and assimilationists emphasizing the role of technological change (see Timmer, 2000). Accumulationists argue that physical capital accumulation has been more important than total factor productivity growth. Their rather pessimistic prediction that the growth process will run out of steam once sufficient capital has been accumulated, has so far not materialised in South and East Asia.

There is, however, a measure of truth in the accumulationist observation that in early phases of industrial development, wasteful processes of accumulation predominate, whether in Stalinist Russia, Maoist China, Nehru's India or Nyerere's Tanzania. Industrialisation in Korea and Taiwan also started with capital accumulation in combination with cheap unskilled labour in textiles and assembly activities. This 'primitive' accumulation usually goes hand in hand with highly distorted markets, extensive government intervention, protection and large scale of production (Lin et al., 2000). These phases have been associated

with import substitution policies discussed below under intermediate factors.

The key question is whether, after accumulation processes have been set into motion, an economy can upgrade its production technology, achieve shifts from low-tech sectors to medium and high tech sectors, and increase overall efficiency. All these processes will express themselves in total factor productivity growth. One of the typical differences between success and failure in economic development lies in the realisation of this switch from accumulation to upgrading.

The development experiences of both the newer and the older Asian industrialising countries demonstrate that the accumulationists have been too pessimistic. On average, TFP growth rates since the 1990s have been higher than in the 1970s and 1980s. Growth has accelerated, human capital has been upgraded, new sectors have emerged and new technologies have been absorbed. The assimilationists are also right in emphasizing that even the raw accumulation of physical capital requires a major effort of mastering, adapting and implementing imported embodied technologies. Thus, TFP change in developing countries is closely associated with the international transfer and acquisition of technology.

Intermediate sources

• *Prudent macroeconomic policies*

It is now becoming customary in academic circles to routinely sneer at the Washington consensus (Williamson, 1990) underlying the neoliberal policies in developing countries since the 1990s. However, there is strong evidence that macroeconomic stability and prudent fiscal and monetary policies have been essential ingredients in the Asian growth performance and successful growth episodes elsewhere.

It is the inability of Latin American countries to implement sustained macroeconomic stabilisation policies over longer periods of time, which underpins the disappointing performance of Latin American policies since the oil shock of 1973. In Latin America, bursts of painful macroeconomic restructuring adjustment have been followed time and time again by populist waves of resistance against adjustment policies. Thus, it seems as if Latin America is primarily experiencing the negative side of economic orthodoxy: painful restructuring without long-term benefits following from sustained adjustment policies. This inability to realise sustained macroeconomic stability may well have to do with high degrees of initial inequality in Latin America which creates political

stresses and pressures that affect the economic policy stance.[12] The present re-emergence of Peronist-type policies and populist political movements in Venezuela and Bolivia bodes ill for their economic future in the longer run.

However, orthodox macroeconomic policies are in themselves not sufficient to attain high growth rates and increased economic welfare. These also requires micro-economic changes and supporting industrial and technology policies which allow for a transition from capital accumulation to technological upgrading.

• *Policies aimed at achieving a balance between agricultural and industrial development*

Balanced growth path theory emphasizes that growth is enhanced if the different sectors grow at such rates that they do not act as a brake on growth in other sectors. This is especially relevant for the agricultural sector. As the agricultural sector provides food to the urban population, intermediate inputs to manufacturing and a market for industrial products, policy discrimination against agriculture has a negative impact on industrial growth and development success. Between 1945 and 1960, development policies discriminated heavily against agriculture, with markedly negative results. Countries in sub-Saharan Africa which had long been self-sufficient in food production, became more and more dependent on agricultural imports and food aid. Negative climatic conditions and droughts account for some of this impact, but man-made policies were at least as important in explaining agricultural stagnation.

In parts of the developing world, intersectoral policies started changing from 1960 onwards. Especially, India, China, Vietnam, Thailand and Indonesia started taking a more balanced approach (Timmer, 2005). The policy bias against agriculture continued longest in sub-Saharan Africa, up till around 1980 or later. It is only since the 1990s that changes have started being implemented here in the context of structural adjustment programmes. These changes refer to the gradual elimination of price controls, marketing boards and similar exploitative institutions that discriminate against agriculture.

• *Trade regime : Outward economic orientation*

The developing countries which are economically most successful are

[12] This is an example of the intermediate character of economic policy, which in turn is influenced by more ultimate conditions in a country.

invariably those that opened up to the outside world and engaged in international trade. (e.g. Sachs and Warner, 1995; Rodrik, 2003). Those countries that remained inward-oriented for too long, were the countries that stagnated. The degree of export-orientedness is one of the key elements distinguishing Southeast Asia from Latin America. Latin America continued inward-looking policies much longer than the East Asian economies. The outward orientation of the East Asian economies contributed to an appropriate choice of techniques, where economies made optimal use of their supply of cheap labour to become competitive on world markets.

• *Openness to foreign investment*
Openness also refers to the role of Foreign Direct Investment in the economy. Though Japan and South Korea are famous examples of countries that were able to acquire international technology, without opening up in any important ways to foreign investment, this route is no longer open to most developing countries (Westphal, 2002). Since the 1970s, FDI is one of the key channels of technology acquisition. It has played a very positive role in countries with sufficiently developed absorptive capacities. The volume and impact of FDI have increased tremendously. The more developed its absorptive capacities, the more a country will profit from FDI. The less developed the absorptive capacity of a country, the more exploitative will the role of foreign capital be.

• *Trade regime: Reducing protectionism*
The evidence that trade openness is positively linked to economic success is mixed. Some studies see a connection between openness and growth, other (e.g. Fagerberg and Srholec, 2006) question the direct correlation between indicators of openness and growth. This finding is not so surprising and reflects the historical poverty of cross-country regression methods.

Why is the evidence so mixed? First, in almost all cases of economic success, outward orientation was preceded by a period of closure, protectionism and import substitution. The only exceptions that come to mind are the city states of Hong Kong and Singapore, which were simply too small to depend on their domestic markets. For most successful developing countries, import substitution did provide the time required for learning the basics of industrialisation. There are few examples of developing countries which started exporting manufactured goods from scratch.

Examples of formerly inward-looking economies which turned outwards include South Korea, Sri Lanka, Taiwan, India, China and Indonesia. In this respect, the much maligned import substitution has played a positive role in the economic history of the presently economically more successful developing countries. The present emphasis in the world trade negotiations on unconditional trade liberalisation by the poorest developing countries may disregard the positive role that protection has played in the past (Chang, 2002).

In the second place, the outward orientation of the successful East Asian economies has not been synonymous with import liberalisation and reduced levels of industrial protection. In spite of the smoke screens thrown up in the ambiguous World Bank study, *The East Asian Miracle* (1993), policy interventions and import protection continued to play and important role in most of the successful Asian economies (except in laissez-fair Hong Kong).

On the other hand, it cannot be denied that protectionist policies tend to nurture inefficiency, waste and economic stagnation, by reducing incentives for competition. This occurred in both in Latin America and sub-Saharan Africa. In China, the protected state enterprises continue to be a burden on the overall economy. The sooner economies exposed their firms to the discipline of the market, the more they profited from the learning effects of the preceding period of import substitution. The later the turn outwards, the more the inefficiency generating effects of protection predominated. The acceleration of growth in China and India was unmistakably accompanied by a shift towards a more-outward looking stance in trade policy, reduced protection and an increase in competitive pressures. Economic stagnation in Africa and Latin America is associated with continued protection which was conducive to inefficiency and rent seeking behaviour.

• *Financial openness*

Not all forms of openness are beneficial for growth and development. Since the financial crises of the 1990s, in particular the Asian crisis of 1997, a convincing case has been made for retaining some measure of control over short term capital flows, to avoid extreme destabilisation in globalised financial markets (Stiglitz, 2000, 2002; Tobin, Eichengreen, 2000). Premature financial openness makes developing countries with underdeveloped financial markets and shaky banking systems more vulnerable to external shocks.

• *International trade policies*
In the longer run, international trade policy and reduced restrictions on international trade achieved in successive GATT negotiation rounds have had positive effects on industrialisation and growth in developing countries and have contributed in major ways to their increased access to developed country markets. The great exception has been agricultural protection, which has continued almost unabated to the present day to the detriment of the primary export prospects of developing countries, whether of the poorest LDCs in Africa or the more affluent Latin American countries.

• *Liberalisation, deregulation and market orientation*
Acceleration of growth in Asia has unmistakably been accompanied by economic liberalisation, deregulation, privatisation and the turn towards markets in the vast economies of China, India and Indonesia. In Africa, liberalisation initially led to further economic decline, deindustrialisation and stagnation as non-competitive parastatals were exposed to international competition. In Latin America, the record of liberalisation has been mixed, primarily because liberalisation of trade, finance and domestic markets led to increased macroeconomic instability in countries such as Argentina, Bolivia, Brazil, Mexico and Venezuela.

State-led growth was able to achieve substantial rates of capital accumulation in the post-war period in Brazil, Mexico, India and China, Soviet Russia, Tanzania, Zambia and Kenya. But it failed to deliver sustained growth, as planned economies were too inflexible and rigid to respond to increasingly rapid changes in domestic and international demand, in technology and in the global division of labour. State-led policies may be appropriate for rapid capital accumulation in the initial stages of industrial development but not for total factor productivity growth and technological upgrading. For sub-Saharan Africa, one can conclude without any hesitation that state intervention, nationalisations and forced industrialisation policies stifled growth after promising beginnings in the 1950s and 1960s.

• *Industrial and technology policies*
The Asian Miracle (1993) attempted to reinterpret the Southeast Asian economic success as the result of outward orientation and market-friendly policies. But the conclusions of the study contradicted many of the interesting chapters included in the book, which gave ample evidence of the heavily interventionist nature of economic policies in

most of these economies. This has since been confirmed in a whole range of studies which definitively confirm the interventionist nature of East Asian economic policy (Westphal 2002; Amsden 1989; Wade 1990). Economic policy was not simply directed at import liberalisation and market liberalisation. On the contrary, high rates of protection were maintained and key sectors, conglomerates and even enterprises were supported and subsidised.

Science, technology and educational policy acted as a supplement to economic policy. Industrial policy was oriented towards upgrading and the shift from traditional low-tech sectors such as textiles to high-tech sectors such as electronics. Technology policy was directed at improving domestic research capacity, improving human capital and acquiring international technology. Technology policy and industrial policy interacted to promote learning, acquisition of technological capabilities and absorptive capacity. Thus the choice to invest in a given sector such as electronics in Malaysia was not only determined by immediate economic prospects, but also by long-run learning prospects.

In Kicking Away the Ladder, Chang (2002), argues that in the present-day orthodox liberal world economic order, the developing countries in Africa and Latin America that are seeking to emulate the experiences of the Asian countries, are deprived of the tools and instruments which contributed to success in the past, such as some degree of protection and interventionist technology and industrial policies. Chang's conclusions are logical and derive from a realistic interpretation of policies in Asia. Nevertheless, his policy advice is not without risk for Latin America and even more so for sub-Saharan African countries.

In sub-Saharan Africa it is clear that state policies themselves have been among the main sources of economic stagnation. In this context, one should be wary of anything that increases the discretionary power of the state apparatus. State policies have contributed to the destruction of agriculture in countries that had food surpluses at the eve of their independence. State policies have led to forced industrialisation strategies that have been a failure across the board and resulted in industries with a negative contribution to GDP at world prices. State policies have squandered natural resources and riches in a wide range of countries. Thirty years of industrial protection has not resulted in sufficient learning experiences. On the contrary, it has created deeply inefficient parastatal enterprises which were unable to compete in a liberalised setting and which melted down when protection was abolished (For Tanzania see Van Engelen et al., 2001).

Given the institutional quality of the state apparatus in Africa, it is likely that the present trend towards liberalisation and withdrawal of the state from the economy may be the best of bad options. There are some indications that after 10 years of deindustrialization in East Africa, some countries such are starting to experience some recovery. These include countries such as Zambia, Tanzania or Mozambique which are starting to profit from inflows of foreign direct investment and accelerated growth since 2000 (e.g. Portelli, 2006). At a later stage, if and when the quality of governance and government institutions has also improved in Africa, one might revisit the debate reopened by Chang. But, not at this moment.

My conclusion is that the debate concerning industrial and technology policy and the use of instruments of protection cannot be separated from the debate about the quality of government institutions. The more effective government institutions, the more scope there is for policy interventions. It is also relevant for the policy debate that the acceleration of growth in China, India and Indonesia in the nineties was associated on balance with a marked trend towards deregulation, privatisations and a strengthening of market forces.

• *Aid policies and debt relief*

Aid is not a major determinant of successful economic growth and development. Never in economic history have inflows of aid been responsible for a country's turnaround from stagnation to growth and catch up. Ultimately, growth and socio-economic development can only be realised through internal efforts, entrepreneurship, policies and internal dynamics. At best, the positive effects of aid on growth and development are marginal.

In the absence of endogenous growth dynamics, the impact of aid on poverty reduction is limited. Rapid reductions of the number of people below absolute poverty lines can only be achieved in the context of rapid growth of per capita incomes, as in present day China, India, Vietnam or in Indonesia under the Suharto regime.

Nevertheless, aid flows can supplement domestic savings and commercial financial flows. In a favourable context, they can contribute to the alleviation of bottlenecks in development. Thus aid flows have contributed to breakthroughs in agricultural research and to the diffusion of new agricultural technologies. They have also contributed in important ways to expansion of educational systems in developing countries, which are important investment in human

capital accumulation. Well-targeted aid flows can also contribute to the realisation of limited but important developmental goals, such as the eradication of river blindness, tuberculosis, treatment and prevention of aids or malaria, improving sanitation and water supply or the diffusion of contraceptive techniques and birth control methods. But of course in the long run, a developing country will only be able to finance its own health and social service infrastructure if it improves its productive capabilities. In the absence of this, the country eternally continue to be dependent on aid flows.

In the worst case, aid flows allow governments to continue ineffective and economically counterproductive agricultural and industrial policies, which they would not have been able to sustain in the absence of aid flows.

Aid becomes counterproductive when aid flows are too large as a percentage of GDP. There is a potential negative effect of very large inflows of aid, which have a distorting influence on entrepreneurial incentives. Latent resources of innovativeness and entrepreneurial spirit increasingly become diverted from productive investment towards gaining access to aid resources, subsidies and aid projects. There is no hard empirical evidence for the threshold level beyond which aid flows start having a negative impact on the long-run prospects of growth and dynamism. Hermes and Lensink (2002) argue for an unrealistically high 50 percent threshold beyond which the marginal returns to aid decline. My working hypothesis – so far empirically untested and not more than a hunch - is that a sustained inflow of aid beyond a threshold level of around 10 percent of GDP will seriously sap the long-run productive potential of a country.

From this perspective, one cannot but be deeply sceptical about the realisation of the millennium development goals and critical of the hype surrounding them. After his enthusiastic contribution to big bang theories of rapid transition to the market which have contributed to economic disaster in the Russian Federation, Jeffrey Sachs, the *auctor intellectualis* of the Millennium Goals, now wants to save the world, preferably within ten years. Lessons from past experiences with big push strategies are being disregarded (Easterly, 2006). This will almost inevitably lead to new disappointments. For instance, the proposed doubling of aid flows to sub-Saharan Africa will not lead to more rapid growth in the absence of improved absorptive capacities. Therefore, it will also not lead to poverty reduction. This is irrespective of the number of poverty reduction strategy papers desperate government officials in

African countries are forced to draft by international agencies.

An possible exception to this negative scenario might be when aid takes the form of large-scale debt relief. Some of the poorest countries have borrowed themselves into situations where debt overhang acts as a disincentive to any kind of economic effort. Reckless lending by international financial institutions and private banks has contributed to this situation. Therefore, at least part of the responsibility for indebtedness lies with these institutions. Past attempts at debt restructuring were often no more than attempts to bail out the global system of financial institutions, by refinancing developing country debt, while maintaining their indebtedness. Large-scale debt relief for the poorest countries could clear the deck for a fresh start. There is some evidence that some of the poorest countries are now benefiting from the HIPC initiative. Financial flows associated with debt relief do not have the distorting effects on entrepreneurial effort discussed above.

Debt relief does presume prior changes in the nature and transparency of policy making. If these changes are not forthcoming, debt relief will simply reward ineffective policies and allow for their continuation by the same elites that were responsible for the failures of the past. It discriminates against countries, which have followed more prudent borrowing policies.

Ultimate sources

In the light of our rejection of mono-causal explanations, generalising about the ultimate sources of growth is perhaps the hardest of all. Here I discuss a number of the key factors from the literature.

• *Scientific and technological advance*

Long-run changes in science and technology are among the ultimate sources of increases in productive capacity. The locus of such change is in the most advanced economies of the world economic order. From there, technological change spreads and diffuses to those developing countries that have sufficient absorptive capacity to profit from global technological change. But scientific and technological advance itself depends on the institutional and cultural incentives for intellectual and inventive effort and the resources invested in the progress of knowledge. It is thus entangled with other ultimate factors.

The rate of scientific and technological change is accelerating. From the perspective of developing countries this is a double-edged sword. For some countries technological change creates new opportunities for

catch up and even leapfrogging. Thus, rapid advances in communication and information technology in the post-war period allow for the emergence of global production chains and the rapid outsourcing of large parts of manufacturing production to developing countries. On balance, this has had tremendous advantages for developing countries. In the service sector, technological change creates unexpected new opportunities for developing countries, such as the outsourcing of call centres, administrative work and soft-ware programming which were not available in earlier periods. Rapid advances in biotechnology create opportunities for breakthroughs in agricultural production and health care of which some countries have availed themselves.

But the acceleration of technological change creates increasing problems for those countries which are falling behind and do not have the absorptive capacity to tap into global change. Such countries are in danger of becoming even more marginalised and stagnant than they already were. These issues will be taken up again in the final section of this paper.

• *Initial conditions: Prior productivity increases in agriculture*
Prior productivity increases in agriculture are among the conditions facilitating the emergence of industry in a developing country. Productivity increases in agriculture create a surplus available for investment (Timmer, 1988). Productivity increase in agriculture releases resources for industrialisation in the early stages of industrialisation, without endangering domestic food production. Countries illustrating this phenomenon include post-war Korea and Taiwan, Japan in the late nineteenth century, Britain in the eighteenth century, China after 1978. African agriculture is a negative case in point. Low productivity in traditional agriculture provided an inauspicious starting point for the African industrialisation drive in the second half of the twentieth century.

• *Initial conditions: Historically determined initial levels of economic and social inequality*
In the post-war period, lower initial levels of economic inequality of income and land ownership create a more favourable setting for growth. Extreme inequality constrains the size of domestic markets, creates perverse economic incentives and sets the stage for political instability. The Iberian colonial legacy of embedded inequality in Latin America has created institutional barriers to the participation of larger

proportions of the population in the growth process. This inequality is the latent source for the periodic emergence of populist movements, which have followed growth-destroying policies. On the other hand, radical land reform in both China and Taiwan created a more equal initial situation in the fifties which was conducive to subsequent growth.

• *Political stability and the emergence of pacified nation-states.*
Political pacification and the emergence of stable nation-states is one of the most important ultimate sources of economic growth. As emphasized by Max Weber, without a stable national monopoly of the means of violence, centralisation and standardisation of regulation within the nation-state, the predictability which is required for long-term investment and entrepreneurship is lacking. Political instability, wars and ethnic conflict are amongst the most important sources of economic stagnation, as evidenced by current conflicts in Somalia, Sudan, Pakistan, Iraq and Congo, to name but a few examples.

The present sources of economic stagnation in many African and Asian countries are not primarily economic in nature. Rather they refer to the absence of political centralisation, standardisation and the evolution of a stable national monopoly on the means of violence. Both cross-country regression studies and historical studies point to the overwhelming importance of the existence of a stable national political framework for economic activity.

In Africa, borders only recently drawn by colonial rulers in the late nineteenth century frequently do not coincide with cultural and ethnic traditions. The legitimacy of the central state institutions in multi-ethnic states is weak. The instability of present-day states in turn is also influenced by pre-colonial political history. Though more and more is being discovered about ancient African empires, we conclude that the degree of political centralisation in African history was far weaker than in other historical settings. The impact of central rule on everyday life was more modest and large numbers of people lived in tribal and acephalic political settings. One of the key factors distinguishing Latin America and in particular Asia from Africa is a far longer and more pervasive historical experience with centralised political rule.

The lack of internal stability in African states is compounded by external intervention by outside powers each supporting their ethnic clients and exacerbating internal conflict. Thus, for much of the post-war period Africa was the arena of cold-war conflict by proxy. Since the end of the cold war, African nations themselves have increasingly intervened

in other African countries (e.g. in Congo, and West Africa).

• *The quality of political institutions.*
Where the legitimacy of state institutions and the nation-state is weak, the stage is set for the emergence of states which rule on behalf of specific ethnic groups or class interests. In such settings, state economic policy is almost exclusively aimed at maintaining the power of the ruling group or class, at the expense of other segments of society. For Africa, the term 'predatory state' has been coined for political systems which are almost exclusively oriented to keep the strong man in power, such as Mobutu's Zaire or Zimbabwe's Mugabe. Other observers refer to these phenomena as the 'neo-patrimonial state' (Sandbrook, 1986; Bratton and van de Walle (1997)).

The predatory state is an extreme pole of the dimension of the quality of political governance. The quality of state institutions also depends on bureaucratic capabilities, the degree of insulation of the bureaucracy from pressure groups (e.g. South Korea as a positive example) and the regulative burden claimed for governments. One of the most interesting paradoxes of post-war socio-economic development is the existence of weak states with disproportionately heavy economic tasks and a wide range of discretionary powers. The absence of bureaucratic traditions and experience, low remuneration, the use of the state apparatus as an instrument for holding on to power and the discretionary powers all contributed to the institutionalisation of corruption. The present worldwide shift towards a more limited role for the state in economic development should not interpreted solely in economic terms, but against this wider backdrop op potentially venal state institutions. From this perspective, the present resurgence of structuralist theories calling for renewed interventionism and state activism should be viewed critically.

• *Corruption*
In cross-country regressions, corruption is often identified as a key institutional determinant of economic development. But, differences in corruption cannot explain why some countries stagnate and others develop. In some economies the proceeds of corruption are reinvested productively. In others they are stashed in Swiss banks, or frittered away on golden shoes or golden palaces. Nigeria has been emasculated by corruption, but corruption under the new order of Suharto in Indonesia was compatible with thirty years of dynamism, between 1966 and 1997.

It is a major puzzle why the Suharto regime responded so effectively to the economic crisis of 1984, in spite of widespread corruption, while corruption contributed to an inadequate Indonesian policy response to the Asian crisis of 1997 (Temple, 2003). The Texan robber barons of the nineteenth century were deeply corrupt, but nonetheless very dynamic. China's pervasive corruption does not stand in the way of its impressive economic dynamics. On the basis of these examples one might somewhat provocatively advance the proposition that some types of corruption are economically sustainable.

As an aside, it is customary to criticise developing countries for their pervasive corruption, but this often rather hypocritical and paternalistic. In the Western capitalist economies large-scale corruption has been institutionalised in the form of the extortionate mutual remuneration by small clique of top managers and directors, who are accountable to no one. They siphon away immense riches in the form of bonuses and stock options that have no relation to risk or performance whatsoever. This enrichment proceeds at the expense of the customers, the shareholders, employees, the firms and society at large. The main difference with developing countries is that these managers operate within the law. They have succeeded in legalising their corrupt practices. This does not show up on the corruption indexes of transparency international. Though the case of Enron amply illustrates the destructive effects of this kind of institutionalised corruption, it has so far not formed a serious obstacle to the dynamics of the leading economies.

• *Democracy and economic development*.

There is a highly charged debate about the relationship between democratic institutions and economic development. Is democratisation a factor contributing to economic development, or is it an obstacle? There are examples of democratic countries such as India which have achieved a measure of economic success in the post-war period, but there are just as many examples of dictatorial or autocratic states with strong development drives, such as Singapore, Taiwan, South Korea, China or Vietnam in the post-war period. Autocratic states potentially allow for the insulation of economic policy making from pressure groups and interest groups, such as was the case in South Korea.

It is sometimes argued that democratic politics have a negative effect on economic growth in developing countries, because populist measures will inhibit long-term processes of accumulation (e.g. Barro, 1996). But, autocratic institutions also increase the risk that, in the absence of

checks and balances, major policy mistakes will be catastrophic, such as in China's great leap backwards from 1958 to 1960, Mugabe's single-handed destruction of the economy of Zimbabwe or North Korea's maintenance of a starving garrison state.

Cross-country regressions provide mixed evidence about the effects of democracy on economic development, as seems inevitable with this type of econometric research. One of the older survey articles (Helliwell, 1994) rightly concludes that democracy is neither a prerequisite for nor an obstacle to economic development. What causality there is works the other way round. As countries advance economically, their citizens tend to prefer more democratic institutions. An optimistic interpretation of this finding is that while democracy is not a condition for economic development, there is no reason why successfully developing economies could not become more democratic.

• *Institutions*

Institutions and institutional quality are increasingly mentioned as important determinants of development. But it is hard to go beyond description and examples to generalise about how institutions affect growth and development. The most general formulation is still that of North and Thomas (1973), who argue that institutions that align individual interests with social welfare are conducive to economic development. In their analysis, well-defined property rights have been crucial for Western European economic development. The extent to which property rights are protected depends in turn on the balance between state power and the power of entrepreneurial groups. State formation and state power are important in establishing and maintaining property rights, but excessive state power will stifle entrepreneurial freedoms. Other important innovations with regard to property rights focus on the emergence of joint stock companies, which limit individual risk and liabilities.

Property rights affect both rates of accumulation and rates of innovation. Without well-defined and well-enforced property rights, entrepreneurial individuals have little incentive to take a long view and to invest in future growth. In the same way, protection of intellectual property rights allows inventors to enjoy the fruits of their innovative efforts. However, the focus on protection of intellectual property rights has also been criticised. Some types of innovation are based more on collective invention, than individually patented inventions. Thus, there seem to be alternative ways to align individual interests with

collective growth and dynamism. Also some types of accumulation can successfully be performed by states rather than by private entrepreneurs. Nevertheless, the focus of North and Thomas on alignment or misalignment of incentives through economic institutions continues to be a very promising line of analysis.

• *Cultural Factors: Work ethic, savings and entrepreneurship*
Though monocausal cultural explanations of development which relate economic development to specific religions or cultures have largely been debunked, one can identify some common attitudinal characteristics in successful developers, which are rooted in culture. These elements include a strong work ethic and social discipline, a high value placed on education and learning, attitudes conducive to high savings rates, low levels of risk aversion and positive attitudes towards entrepreneurship. Both Protestantism and the Confucian ethic value sobriety, hard work and savings.

Thus, attitudes can evolve in very different religious and cultural contexts, such as Puritan Protestantism, modernistic Islam or Confucianism, but they do seem to be important in the context of economic development. Of course, cultural traits are neither exogenous, nor immutable. When incentives change and new opportunities arise, older cultural adaptations to economic stagnant circumstances will start to change. But, cultural traits do emerge from very long historical experiences and adaptations and change only slowly.

The role of extended family ties in economic development illustrates the ambiguity of cultural factors. On the one hand, there is a large older literature focusing on the negative influence of extended family obligations on entrepreneurship and investment. Entrepreneurial success results in redistributive obligations which are an obstacle to further entrepreneurial success. On the other hand, there is a recent literature on the positive functions of family ties in East Asia as a resource for capital accumulation and entrepreneurship.

• *Cultural factors: Developmental drive*
In historical examples of successful catch up, a factor which comes to the fore is 'developmental drive'. This refers to an interplay between political elites who define developmental goals (as the Meiji reformers in Japan, the leaders of China's present capitalist drive, Suharto's new order, or a variety of post-war nationalist regimes) and feelings of national pride and resentment at the present position of the nation in

the international order.

• *Cultural factors: Openness to the outside world*
One of the key cultural attitudes favourable to successful development is openness to the outside world. This involves a willingness and eagerness to acquire and assimilate technology and knowledge from leading countries in the world economy, whichever they are. When a society turns inwards and rejects outside influences as either inferior or too threatening, or when a society cultivates too much resentment against these influences, it will tend to stagnate. Such attitudes help explain the loss of momentum of the early European leaders Portugal and Spain from the sixteenth century onwards when religion became dogmatic and anti-scientific, the long centuries of Chinese stagnation after the fourteenth century, China's failure to catch up in the late nineteenth, early twentieth century, as opposed to Japanese success, and economic stagnation in the post-war Middle Eastern world.[13]

But it is not clear whether the openness to the outside world is a deep-seated cultural trait of a country's whole population. Rather, openness tends to depend on cultural traits of dominant elites. When China turned inward in the fifteenth century, this was primarily the outcome of a power struggle between the court mandarins and the eunuch admirals, which was won by the former.

• *Climate, soil conditions and energy and mineral resources*
Geographic determinists such as Jeffrey Sachs (2004) and Jared Diamond (1998) argue that geographic factors such as climate, soil conditions, mineral locations and distance from continental coastline are important ultimate determinants of growth and stagnation. Thus, moderate climate, location on the seaboard, fertile soils and resources such as coal, oil, gas or minerals are seen as determining the chances of developmental success.

The claims for geography are overstated in the context of the modern world. Geographic conditions do not determine success or failure in development. For every factor mentioned by the determinists, there are powerful counterexamples. Nowadays, many tropical countries and regions with intemperate climates show very rapid growth. Resource poor countries such as Japan and Korea have experienced spectacular catch up. There are many examples of very prosperous landlocked

[13] In this sense, the present revival of flat-earth thinking and anti-Darwinian religious fundamentalism in the USA bodes badly for future US economic leadership.

economies such as Switzerland, Austria, Southern Germany or Botswana and of stagnating seaboard economies such as Eritrea or Zambia. In the post-war period, oil riches have more often been a negative source of growth than a positive one.

In his more nuanced formulation of proximate and ultimate causality, Rodrik argues that geographic conditions are part of ultimate causality, because they determine the geographic conditions that people in a country have to grapple with. Thus they influence the path of development a country follows. Policies and human actions have somehow or other to take into account location factors, resource availability, climatic conditions and soil conditions. But, this does not mean that one or another of these factors is a decisive determinant of development success of failure in itself.

• *Demographic trends*

Demographic trends are important amongst the more ultimate sources of economic development. The pace and nature of economic development is influenced by population size (the pattern of development of countries with large internal markets differs from that of small Island economies), population density, rates of population growth and dependency ratios which affect rates of capital accumulation. In China and India, vast populations result in large internal markets which contribute to acceleration of growth once domestic incomes start to increase even modestly. In many sub-Saharan African countries, population growth has exceeded growth of GDP since 1973, resulting in stagnating per capita incomes. Population growth has also exceeded the rate of technological change in agriculture. As a result diminishing returns to traditional agricultural practices have resulted in stagnation of food production.

Demographic trends, by the way, illustrate the circularity of processes of development. Demographic trends affect economic development in a variety of ways, through labour supply, age structure and pressure on resources. But, economic development and social modernisation in turn result in a reduction of birth rates and a slowdown in population growth, which create windows of opportunity before the aging of populations starts exerting negative effects on growth prospects.

Ester Boserup has made a convincing case for the importance of demographic trends as driver of economic growth and technological change (Boserup, 1995, 1981). Her argument, in a nutshell, is that increasing population densities with given production technologies result in increasing pressure on resources and diminishing returns.

They also create incentives for technological advance and intensive cultivation practices in agriculture and technological change in general, which may more than counteract diminishing returns. Success in development occurs when the localised race between technological change and population growth is won by technology. Factor proportions may influence both the nature of economic development and the direction of technological changes, as argued by the induced innovation hypothesis (Hayami and Ruttan, 1985). An example of the importance of factor proportions is the way in which surplus labour in East Asia has contributed to the success of labour intensive manufacturing.

Though Boserup argues that the link between population and technological growth is weakening since the end of the nineteenth century, due to improvements in transport and communication technology, it can still be seen to operate in the post-war period. Thus, productivity growth in post-war agriculture is primarily found in countries with the highest population densities in Asia (India, China, Indonesia), while agricultural productivity in low density Africa has stagnated. Densely populated urban centres are invariably the locus of technological advance.

More generally, the anti-Malthusian argument is that increasing pressure on resources creates incentive for technological change, and makes technological alternatives in production and energy supply more viable.

• *The distance to the technological frontier*

The distance to the technological frontier should also be seen as one of the ultimate sources of growth. The greater the technology gap, the greater the potential for rapid catch up. It defines the initial conditions for growth and stagnation in the post-war period (Gerschenkron, 1962; Abramovitz, 1989).

When there is sufficient technological congruence between the technological leaders and followers and social capabilities and absorptive capacities are sufficiently developed, countries can experience explosive catch up, due to the rapid absorption of technologies developed elsewhere.

Verspagen (1991) has argued that technological potential is not simply a linear function of the size of the technology gap. If the technology gap becomes too large, technological congruence will decline and, given a certain level of social capabilities (learning capabilities, absorptive capacity), it becomes more difficult for countries to catch up.

• *Absorptive capacities.*

Though knowledge has an inherent tendency to flow and diffuse, catch up is not automatic. Otherwise than argued by Veblen, absorption of technology is far from easy. It is more than simple imitation. It involves effort, creativity, organisational innovation and technological adaptation (Fagerberg and Godinho, 2006). Absorbing international knowledge and technology requires a highly developed absorptive capacity, which does not come free of charge. While lead countries in the world economy need to invest in advancing the frontiers of knowledge, follower countries in the developing world primarily have to invest in improving their absorptive capacities. Only when they start moving closer to the technological frontier, will they need to reorient their efforts and policies to knowledge production. This has happened in Korea and is presently happening in China and India.

One of the reasons why absorption of technology is more than simple transfer of technology is that successful technology transfer almost always involves adaptation to local circumstances, institutions and conditions. Both the mastery and the adaptation of technology require considerable effort and skill. And as economic development progresses, adaptation is replaced by upgrading and investment in technological advance, which requires even more skills.

This notion of the difficulty of absorbing technology explains why some countries are able to profit from international technological advances, while others cannot and become mired in stagnation. As a wide range of authors have emphasized, catch up requires highly developed social and technological capabilities. As mentioned above, these capabilities in turn depend on the size of the technology and productivity gaps. A traditional agricultural economy such as Burkina Faso will find it almost impossible to absorb advanced technology from the USA, Japan or Europe because the technological distance is simply too large.

Successful catch up involves the prior investment in technological and social capabilities which allow countries to acquire and master international technologies. Social and technological capabilities include educational levels, the orientation of education, technical and financial skills, a disciplined workforce, institutions which stimulate entrepreneurship, and sufficient political and economic stability to make risk taking worth while (Abramovitz, 1989). There is also a more micro-oriented literature deriving from authors as Sanjaya Lall focusing on firm level capabilities and efforts (Bell et al., 1982; Lall, 1992, 1996; Romijn,

1989). Lall and others distinguish: production capabilities, investment capabilities and innovation capabilities which allow firms to adapt and further develop technologies.

The improvement of firm-level capabilities is a microeconomic aspect of the macro concept of social capabilities à la Abramovitz. A third rapidly growing body of literature which is relevant for absorptive capacity is the systems of innovation literature (Lundvall 1992; Nelson, 1993). Absorptive capacity is not determined only by the some total of the capabilities of the micro agents. It is also determined by the nature of the interactions between actors (firms, research institutions and government agencies) and the institutions influencing these interactions. The more effective a system of innovation, the more rapidly knowledge will spread within a country and the more effectively will a country be able to absorb technology from abroad.

Tapping into Global Technological Advance as a Characteristic of Catch up Economies

So, far I have discussed a wide range of proximate, intermediate and ultimate factors that affect economic development. At the conclusion of this lecture, I would like to select a few elements for further discussion, which are of particular importance for our understanding of success and failure in development. The argument can be summarised in three propositions: 1. technological change is generated in the leading economies of the international economic order. 2. Developing countries that are able to absorb internationally generated technology can profit from the advantages of technological backwardness. They can experience accelerated catch up. Countries that are not able to absorb technology will tend to fall behind. 3. Differences in absorptive capacity account for much of the difference between success and failure in economic development in the post-war period.

In the present international order there is great inequality in technological efforts. An overwhelming proportion of scientific research and research and development activities takes places in the advanced economies. Technological change emanates from the lead countries in the world economy.

Table 3: US patent activity, 1990-2004

Year	Patents Granted	Share of patents granted (%)		
		Foreign Patents	Developing Country Patents	Developing Countries excl. S. Korea
1990	99220	46.6	1.1	0.3
1995	113955	43.4	2.8	0.5
2000	176083	44.9	4.8	0.7
2004	181322	48.1	7.0	1.0

Source: United States Patent and Trademark Office, TAF Special Report, All Patents, All Types, January 1977-december 2004

An illustration of this is provided in tables 3 and 4. As indicated in table 3, almost all patent applications in the USA originate in the advanced economies. Excluding South Korea, only 1 per cent of patents granted in the USA (the technological leader) in the post-war period originates in developing countries. Similar patterns hold for scientific publications. Large multinational companies take the lead in innovation. Thus the fifty largest multinationals alone account from 26 per cent of all patents in the United States. According to estimates by the World Health Organisation, 95 per cent of all medical research focuses on health problems of the advanced countries (World Bank, 1999).

Table 4 provides information about R&D efforts of larger developing countries in the 1990s. Developing countries invest a much lower proportion of GDP in research and development (around 0.6%) than the advanced economies (around 2.3%). The technological gaps in terms of R&D per head of population are even greater.

Table 4: R&D Efforts, 1987-2003[a]

	R&D as % of GDP 1987-97 b	R&D as % of GDP 1997-2002	R&D per capita PPP internat. $ 1987-97	R&D per capita PPP internat. $ 1997-2002	Scientists & Engineers per 100.000 1990-2003
Average 12 large Asian countries	0.8	0.8	34.5	59.6	490.0
China	0.5	1.2	13.0	55.6	633
South Korea	2.9	2.9	285.0	494.8	2979
Average 7 large Latin America	0.5	0.4	33.7	35.1	321
Average 23 developing countries	0.6	120.6	31.9	47.1	384.2
Average 16 advanced economies	2.1	2.3	438.2	673.4	3785

Sources:

R&D expenditures developing countries from Unesco Statistical Yearbook (1999). R&D and R&D as percentage of GDP in OECD countries from OECD, Science, Technology and Industry Outlook, 1998. Scientists and engineers from UNDP, Human Development Report, 2001-2005.

Notes:

a. Latest year in period for which data are available.

b. The definition of R&D in Unesco statistics on developing countries is more inclusive than the statistics for OECD countries from the Science Technology and Industry Outlook, 1998, which conform to Frascati manual definitions.

Given the location of technological advance, catch up in the post-1950 globalised economy is only possible if developing countries develop the capabilities to acquire, master and adapt international technology. There is not a single example of successful catch up since the late nineteenth century that did not involve tapping into international technology – e.g. Germany, Russia, Japan, Korea, Singapore, Taiwan, Hong Kong, China and India. The countries that, for some reason or other, are not able or not willing to tap into global technology flows, are the countries that are falling behind and are becoming marginalised in the world economy.

For this reason, the romantic myth of indigenous or traditional technology is potentially dangerous for development. The myth of indigenous technology suggests that there exists something like an

appropriate, indigenous technology which is more adapted to the needs and traditions of the developing countries. Such technologies are usually small scale, environmentally friendly, integrated into traditional culture and so forth. In the light of the foregoing analysis, this is a recipe for economic stagnation. One can think of Mahatma Ghandi's preoccupation with small-scale spinning, Mao Zedong's campaign for backyard steel ovens or the Chinese ambivalence towards Western technology around 1900. But one can also think of present day aid workers' love of small water pumps, solar panels and other 'appropriate' technological solutions'. I am not arguing that some of these technologies may not be useful. I am arguing that they will not provide the momentum for growth and catch up that are required to lift millions of people out of poverty.

The myth of indigenous technology disregards the fact that economic catch up is a vast and cataclysmic process involving rapid and destructive economic and technological change. If one travels through present-day South East Asia, one see whole provinces being dug up and restructured.

In developing countries with fairly well-developed social and technological capabilities there are ample opportunities for rapid catch up. If such capabilities are weak or completely absent, than countries will become increasingly marginalised and exploited. Thus one can see the global technology and productivity race as the outcome of two contradictory tendencies. Innovation in the lead countries leads to increased global inequality and falling behind of developing countries. Diffusion and transfer of technology allows for explosive growth and catch up in some of the developing countries, with sufficient absorptive capacities.

Thus, in a modern interdependent economic order, the factor that best distinguishes countries that succeed in catching up, from those that do not, are differences in absorptive capacity. The key sources of catch up in developing countries are absorptive capacity and ability and willingness to tap into global technology. When a country has developed the capacity to absorb and adapt technology and has the eagerness and drive to do so, it can grow at an astounding rate as evidenced by several Asian countries in the post-war period. The Gerschenkronian advantages of backwardness allow a country to profit from technological advance, without bearing many of the costs and risks.

Countries that are hesitant to open themselves to global technological change and associated outside influences, for political, cultural or

religious reasons, do this at their peril, as evidenced by the contrasting patterns of development of Japan and China from the late nineteenth century till 1950. Either a country goes all out in its attempts to acquire and assimilate international technology or it will stagnate.

At first sight, this would again seem to boil down to just another of the monocausal explanations, I rejected earlier in this lecture. But this is misleading. I have argued that technological advance needs to be complemented by a great variety of proximate, intermediate and ultimate factors. Also, we saw that there is not one single explanation of how absorptive capacities emerge. The evolution of absorptive capacities depends on a complicated multicausal mix of ultimate cultural and institutional factors and intermediate policy efforts But the focus on absorptive capacities and the conditions for tapping into international technology flows, helps us in setting our future research priorities in the analysis of success and failure in economic development.

Acknowledgements

Mr. Rector, ladies and gentlemen, this is my second inaugural lecture. I cannot compare it to a second marriage, as I have only been married once in my life. But it is definitely different from my first inaugural lecture at the Eindhoven University of Technology. It has an element of looking back, trying to summarise, however imperfectly, what I have learned from years of thinking about development. It is also given at an age when many people are starting to think about retirement. For me, it marks a new beginning. I am deeply thankful to the Executive Board of the University of Maastricht for taking the not inconsiderable risk of appointing me at this stage in my life and providing me with new challenges.

I am thankful to my new colleagues at the Maastricht Graduate School of Governance and United Nations University-MERIT. Both institutes are exciting initiatives, which provide a stimulating environment for research on developing countries. They have a strong international orientation and a cosmopolitan atmosphere, which can serve as a shining example for many other scientific institutes in the Netherlands and elsewhere. I immediately felt at home at both institutes.

Working at two different institutes might easily result in a split personality. So far this has not occurred, not in the least because the leisurely walk from one end of the Vrijthof to the other in the heart of the city of Maastricht is more effective than most other kinds of

psychotherapy. Also, the two institutes complement each other in many interesting ways. I am glad to act as a link between them.

I am grateful for the warm welcome my new colleagues extended to me. I would specifically like to thank Luc Soete, director of UNU-MERIT and Chris de Neubourg, director of the Maastricht Graduate School of Governance, who were instrumental in my coming to Maastricht. I am happy to have met exciting new colleagues in our research group on Technology, Productivity and Growth at UNU-MERIT. At both institutes, the enthusiastic support on the part of the supporting staff contributes substantially to the quality of our daily work environment. I would like to thank them for this.

I would also like to extend a word of thanks to my former colleagues at the Eindhoven Centre for Innovation Studies and the department of Technology and Policy of the Eindhoven University of Technology. What I have learned about the importance of technology and innovation in growth and development, I have mainly learned from them.

In the short time I have been in Maastricht, PhD students have become a prominent part of my working life. I enjoy the intensive interactions with them. I hope they will do well in their projects and will make substantial contributions to their institutes and their scientific disciplines.

Finally, not for the first or the last time, I would like to thank my wife and life partner Veronika for her never ending support, which seems to be given without limits or reservations. In more than one way, I would not be where I am, without this.

Ik heb gezegd

References

Abramovitz, M, 'Thinking about Growth', in: M. Abramovitz, *Thinking about Growth and other Essays on Economic Growth and Welfare,* Cambridge, Cambridge University Press, 1989, pp. 3-79.

Acemoglu, D. and J.A. Robinson, *Economic Origins of Dictatorship and Democracy*, MIT press, 2006.

Acemoglu, D, S. Johnson and J.A. Robinson, 2001, 'The Colonial Origins of Comparative Development: An Empirical Investigation', *American Economic Review,* **91**, pp. 1369-1401.

Acemoglu, D, S. Johnson and J.A. Robinson , 'Institutions as the Fundamental Cause of Long-Run Growth', in: Philippe Aghion and Stephen Durlauf, eds., *Handbook of Economic Growth*, North Holland December 2005.

Acemoglu, D., 'Constitutions, Politics and Economics: A Review Essay on Persson and Tabellini's "The Economic Effects of Constitutions"', MIT, February, 2005.

Amsden, A., *Asia's Next Giant: South Korea and Late Industrialization,* New York/ Oxford, Oxford University Press, 1989.

Barro, R., *Getting It Right: Markets and Choices in a Free Society,* MIT Press, 1996.

Bell, M., Scott-Kemmis, D., Satyarakwit, W., 'Limited learning in infant industry. A case study', in: F. Stewart, and J. James (Eds.), *The Economics of New Technology in Developing Countries*, London, Pinter, 1982, pp. 138–156.

Boserup, E., *The Conditions of Agricultural Growth,* London, Allen and Unwin, 1965.

Boserup, E., *Population and Technology,* Oxford, Basil Blackwell, 1981.

Bratton, M. and N. van de Walle, *Democratic Experiments in Africa. Regime Transitions in Comparative Perspective,* Cambridge, Cambridge University Press, 1997.

Chang, H-J., *Kicking away the Ladder: Development Strategy in Historical Perspective,* London, Anthem Press, 2002.

Conference Board and Groningen Growth and Development Centre, *Total Economy Database*, November 2007, http://www.conference-board.org/economics"

Diamond, J., *Guns, Germs and Steel. A Short History of Everybody for the Last 13,000 Years,* London, Vintage Press, 1998.

Dicken, P, *Global Shift*, Fourth Edition, London, Sage, 2003

Dosi, G, Ch. Freeman, R. Nelson, G. Silverberg and L. Soete (eds), *Technical Change and Economic Theory,* London, Pinter, 1988.

Easterly, W., *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics,* Cambridge, The MIT Press, 2001.

Easterly, W., 'The Big Push Déja Vu: A Review of Jeffrey Sachs's, The End of Poverty. Economic Possibilities for Our Time', *Journal of Economic Literature,* XLIV, March 2006, pp. 96-105.

Eichengreen, B., 'Taming Capital Flows', *World Development,* **28**, (6), 2000, pp. 1105-1116.

Engelen, D. van, A. Szirmai, P. Lapperre, 'Public Policy and the Industrial Development of Tanzania, 1961-1995', in: A. Szirmai and P. Lapperre (eds), A. Szirmai and P. Lapperre (eds), *The Industrial Experience of Tanzania,* Houndmills, Basingstoke, Palgrave, 2001, pp. 11-49.

Fagerberg J. and M. Godinho, 'Innovation and Catching Up', Chapter 19, in J. Fagerberg, D. Movery and R. Nelson, (eds), *The Oxford Handbook of Innovation*, Oxford, Oxford University Press, 2006.

Fagerberg, J and M. Srholec, 'The Role of "Capabilities" in Development: How Some Countries Manage to Catch Up, Paper Globelics Conference, Trivandrum, October 4-7, 2006.

Fagerberg, J. and B. Verspagen, 'Technology-gaps, Innovation-diffusion and transformation: an evolutionary approach', *Research Policy,* 3, 2000, pp. 1291-1304.

Freeman, C. and C. Perez, 'Structural Crises of Adjustment, Business Cycles and Investment Behaviour' in: G. Dosi, Ch. Freeman, R. Nelson, G. Silverberg and L. Soete (eds), *Technical Change and Economic Theory,* London, Pinter, 1988.

Freeman C. and L. Soete, *The Economics of Industrial Innovation,* 3rd Edition, London and Washington, Pinter, 1997.

Geertz, C., *Peddlars and Princes, Social Change and Economic Modernization in two Indonesian Towns,* Chicago, University of Chicago Press, 1963b.

Gerschenkron, A., *Economic Backwardness in Historical Perspective,* Cambridge, Harvard University Pr¬ess, 1962.

Godo, Y and Y. Hayami, 'Catching Up in Education in the Economic Catch-Up of Japan with the United States, 1890-1990', *Economic Development and Cultural Change,* **50** (4), July 2002, pp. 961-978.

Harrison, L.E., *Underdevelopment Is a State of Mind, The Latin American Case*, Boston, Madison Books, 1985.

Harrison, L.E. and S. P. Huntington (eds), *Culture Matters. How Values Shape Human Progress,* New York, Basic Books, 2000.

Hayami, Y. and R.W. Ruttan, *Agricultural Development: An International Perspective,* Revised edition, Baltimore, Johns Hopkins University Press, 1985.

Helliwell, J.F., 'Empirical Linkages between Democracy and Economic Growth', *British Journal of Political Science,* **24**, 1994, pp. 225-248.

Hermes, N. and R. Lensink (eds), *Changing the Conditions for Development Aid : a New Paradigm?* London, Frank Cass, 2001.

Hirschman, A.O., *The Strategy of Economic Development,* New Haven, Yale University Press, 1988 (1958).

Hoffman, A., Latin American Development, *A Causal Analysis in Historical Perspective*, Groningen, 1998.

Lal, D. and H. Myint, *The Political Economy of Poverty, Equity and Growth. A Comparative Study,* Oxford University Press, 1996.

Lall, S., 'Technological Capabilities and Industrialisation', *World Development,* **20** (2), 1992 pp. 165–186.

Lall, S., *Learning from the Asian Tigers,* Macmillan Press, London, 1996.

Lewis, W.A., *The Evolution of the International Economic Order,* Princeton, Princeton University Press, 1978.

Lin, J. Y., F. Cai, and Z. Li, 'The Lessons of China's Transition to a Market Economy', Paper for APSEM/ANU/World Bank conference, Achieving High Growth, Experience of Transitional Economies in East Asia, Canberra, 6/7 September 2000.

Lundvall, B.A., *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning,* London, Pinter, 1992.
Maddison, A., *Notes on Developing Country Performance,* Mimeographed, Groningen, 1986.
Maddison, A., 'Growth and Slowdown in Advanced Capitalist Economies', *Journal of Economic Literature,* **XXV**, June 1987, pp. 649-698.
Maddison, A, 'Ultimate and Proximate Growth Causality: A Critique of Mancur Olson on the Rise and Decline of Nations', *Scandinavian History Review,* 2, pp. 25-29, 1988.
Maddison, A., *The World Economy. A Millenial Perspective,* OECD, 2001
Maddison, A., *Contours of the World Economy, 1-2030 AD. Essays in Macro-Economic History,* Oxford, Oxford University Press, 2007.
Maddison, A. Historical Statistics, *World Population, GDP and Per Capita GDP, 1-2003 AD (Last update: August 2007)*
Mankiw, N.G, D.Romer and D.N.Weil, 'A Contribution to the Empirics of Economic Growth', *Quarterly Journal of Economics,* 1992, pp. 408-437.
Myrdal, G., *Asian Drama. An Inquiry into the Poverty of Nations,* Harmondsworth, Penguin,1968.
Nelson, R. (ed.), *National Innovation Systems. A Comparative Analysis,* Oxford, Oxford University Press, 1993.
Nelson, R.R., 'Research on Productivity Growth and Productivity Differences: Dead Ends and New Departures', in R.R. Nelson, *The Sources of Economic Growth,* Cambridge, Mass., Harvard University Press, 1996 (originally published in JEL, September, 1981, 1029-1064).
Nelson, R. N. and S. Winter, *An Evolutionary Theory of Economic Change,* Cambridge, Mass., Harvard University Press, 1982.
North, D.C. and R. P. Thomas, *The Rise of the Western World,* Cambridge, Cambridge University Press, 1973.
North, D.C., *Institutions, Institutional Change and Economic Performance,* Cambridge, Cambridge University Press, 1990.
Nuñez, C., 'Literacy and Economic Growth in Spain, 1860-1977', in: Tortella, G. (ed.), *Education and Economic Development Since the Industrial Revolution,* València, Generalitat Valenciana, 1990.
Nuvolari, A. , *The Making of Steam Power Technology. A Study of Technical Change during the British Industrial Revolution,* PhD Thesis, Eindhoven Centre for Innovation Studies, Eindhoven University of Technology, 2004.
Pack, H. and Ch. Paxson, 'Is African Manufacturing Skill Constrained?', in: A. Szirmai and P. Lapperre (eds), *The Industrial Experience of Tanzania,* Houndmills/ Basingstoke, Palgrave, 2001, pp. 50-72.
Portelli, B., *Foreign Direct Investment, Multinational Enterprises and Industrial Development. Backward Linkages and Knowledge Transfer in Tanzania,* TIK, Oslo, PhD thesis, 2006
Qian, Y., How Reform Worked in China, in Rodrik (ed.), op. cit, 2003.
Quah, D., 'Empirics for growth and distribution: Stratification, polarization, and convergence clubs', *Journal of Economic Growth,* March 1997.

Rodrik, D. (ed.), *In Search of Prosperity. Analytic Narratives on Economic Growth,* Princeton University Press, Princeton and Oxford, 2003.

Rodrik, Dani, 'Good Bye Washington Consensus, Hello Washington Confusion? A Review of the World Bank's Economic Growth in the 1990s: Learning from a Decade of Reform', *Journal of Economic Literature,* XLIV, December 2006, pp. 973-987.

Romijn, H.A., *Acquisition of Technological Capabilities in Small Firms in Developing Countries*. MacMillan, London, 1999.

Ruttan, V.W., 'Productivity Growth in World Agriculture: Sources and Constraints', *Journal of Economic Perspectives,* **16** (4), Fall 2002, pp. 161-184.

Sachs, J, M. L. Faye, J. W. McArthur and Th. Snow, 'The Challenges Facing Landlocked Developing Countries', *Journal of Human Development,* **5** (1), March 2004

Sachs, J.D., *The End of Poverty. Economic Possibilities for Our Time,* New York, Penguin, 2005.

Sachs, J and A. Warner, *Economic Reform and the Process of Global Integration,* Brookings Papers on Economic Activity, 1, 1995, pp. 1-118.

Sandbrook, R., 'The State as an Obstacle to Development', *World Development,* **14** (3), 1986, pp. 309-322.

Sandberg, L.G., 'Ignorance, Poverty and Economic Backwardness in the Early Stages of European Industrialization. Variations on Alexander Gerschenkron's Grand Theme', *Journal of European Economic History,* **11**, 1982, pp. 675-98.

Shleifer, A. and R.W. Vishny, 'Corruption', *Quarterly Journal of Economics,* **108**, 1993, 599-618.

Shleifer, A, E. Glaeser, R. la Porta and F. Lopez-de Silanes, 'Do Institutions Cause Growth?', *Journal of Economic Growth,* September, 2004

Stiglitz, J, 'Capital Market Liberalization, Economic Growth, and Instability', *World Development,* **28** (6), 2000, pp. 1075-86.

Stiglitz, J., *Globalization and Its Discontents,* New York/London, Norton, 2002.

Szirmai, A., *The Dynamics of Socio-Economic Development,* Cambridge, Cambridge University Press, 2005.

Szirmai, A, Website Dynamics of Socio-Economic Development, *http://www.dynamicsofdevelopment.com,* 2007

Temple, J., 'Growing into Trouble. Indonesia after 1966', in D. Rodrik (ed.), *op. cit*., 2003.

Timmer, C.P., 'The Agricultural Transformation', in: H. B. Chenery and T.N. Srinivasan, (eds.), *Handbook of Development Economics,* Vol. I, Amsterdam, North Holland, 1988, Chapter 8, pp. 276-331.

Timmer, C.P, Food Security and Economic Growth: an Asian Perspective, *Asian-Pacific Economic Literature,* **19** (1), May, 2005, pp. 1-17.,

Timmer, M.P., *The Dynamics of Asian Manufacturing. A Comparative Perspective,* 1963-1993, Cheltenham, Edward Elgar, 2000.

Tobin, J., 'Financial Globalization', *World Development,* **28** (6), 2000, pp. 1101-1104.

United Nations Population Division, *Long-Range World Population Projections: Based on the 1998 Revision.* United Nations, September 2002a. Dataset in Digital Form:
http://www.un.org./esa/population/publications/longrange/longrange.htm

United States Patent and Trademark Office, *TAF Special Report, All Patents, All Types*, January 1977-december 2004

Van Ark, B. and M.Timmer, Asia's productivity performance and potential: The contribution of sectors and structural change, The Conference Board, 2003.

Verspagen, B., 'A new empirical approach to catching-up or falling behind', *Structural Change and Economic Dynamics,* **2**, 1991, pp. 359-380.

Verspagen, B., *Uneven Growth between Interdependent Economies. An Evolutionary View on Technology Gaps, Trade and Growth,* Aldershot, Avebury, 1993.

Verspagen, B., *Economic Growth and Technological Change: An Evolutionary Interpretation,* OECD, STI WOrking Papers, 2001/1.

Wade, R, *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization,* Princeton, Princeton University Press, 1990.

Westphal, L.E., 'Technology Strategies for Economic Development in a Fast Changing Global Economy', *Economics of Innovation and New Technology,* **11** (4/5), August/October, 2002, pp. 275-320.

Williamson, J., 'What Washington Means by Policy Reform' in J. Williamson, ed, *Latin American Adjustment: How much has Happened?,* Washington, D.C., Institute for International Economics, 1990.

World Bank, *The East Asian Miracle. Economic Growth and Public Policy,* New York, Oxford University Press, 1993.

World Bank, *World Development Report 1989/99. Knowledge for Development,* World Bank/Oxford University Press, 1999.

World Bank, World Development Indicators Online, *http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html*

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